TRANSBOUNDARY LANDSCAPES OF MOUNTAINS IN THE CENTRAL-WEST OF TUNISIA BETWEEN HUMAN ACTIONS AND POLICIES OF PUBLIC MANAGEMENT

Islem Saadaoui[*]

Hayet Ilahi*

Christopher R. Bryant [**]

Hichem Rejeb*

Abstract

The mountains of Bouchebka, in the central-west of Tunisia, form a natural and identity wealth of the region; it is about a joint natural landscape between Tunisia and Algeria. Given, the geographical position, the climatic constraints and the difficulties of the access; the intervention of the territories developers will be thus essential. In this regard, our study arises; it is to seek the possibility of inserting the territories in the development of public policies from a socio-economic study of the environment, which aims to set up a project called eco-green, this project is the establishment of an ecological leisure park. Using a contingent valuation method which is essentially based on inquiries and the socio-economic and factor analysis, it was possible to reveal the results of these evaluations seem very encouraging, in fact, 90% of respondents are willing to pay a well-defined as an active contribution of local actors consent, this contribution varies according to age, sex, income and education level of the respondents. These results reflect the conscience of civil society of the need for action and response to better manage such a space under the pretext of ensuring its sustainability.

Keywords: mountain landscape, landscape border, west-central Tunisia, planning public anthropic action, policies.

[*] Unité de Recherche "Horticulture, Paysage et Environnement", AGR05UR2003, ISA-IRESA-Université de Sousse BP 47, 4042 Sousse,

[**] Laboratoire développement durable et dynamique territoriale, département de Géographie, Faculté des Arts et des Sciences à l'Université de Montréal. C. P. 6128, succursale Centre-ville Montréal QC H3C 3J7.

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1.   Introduction

The progressive mitigation of the borders gives a new dimension to the spaces that they cross. Exchanges, complementarities and competitions developed from these spaces and reveal a new scale of life. the public planning policies accompanying the emergence of these new spaces in order to structure the development and make real term border territories (Saadaoui, 2013). Landscape management is seen as 'the action, from the perspective of sustainable development, maintains the landscape to guide and harmonize changes that are brought about by economic and environmental social change' (European Landscape Convention 2000, Article 1.). The cross-border territory has so a double dimension: it is a population center, of the order of the facts, and territory of project, of the order of the will. The conjunction of these two factors results from a big diversity of situations with which it is necessary to encircle variables to understand these territories and act there. Being a border zone, the landscape of Bouchebka is a joint natural heritage between Tunisia and Algeria, a series of mountains belonging to the Tunisian and going ridge until the mounts of Tébessa in Algeria (Saadaoui, 2013). The objective of this study was to look for the opportunities of the insertion of this landscape in the policies of cross-border developments under the pretext of a sustainable development of this natural environment and to make the connection between the landscape and its occupants.

To analyse this problem we resorted to a socioeconomic method: the contingent evaluation which aims at determining the arrangement of the local actors to contribute in the installation of a project of an ecological park of leisure activities in on this territory. We ended with very encouraging results towards the reaction of the interviewees and their consciousnesses of the necessity of the intervention for sustainable management of this territory (90 % of the interviewees confirmed their participation).

2. Methodology

2.1. Study Site

The region of Bouchebka constitute a part of the sub-region high alfa steppes; The region covers an area of 509,422 ha. It is bordered to the north by the western ridge, on the east by the high agricultural steppe and south by the Atlas link (Saadaoui, 2013).

2.1.1. Geographic Location of the study site

The series of the forest of Bouchebkha part of the great mass of Aleppo pines, located on a plateau between the Djebel Chambi and mountains Tebessa.

It fits entirely in the map 1/50 000 Bouchebkha (n) LXXXIII) between Lambert coordinates: X = 367-378 and Y = 207-215.

It is located in the Governorate of Kasserine, the delegation of Feriana is limited:

- North: land of crops and Ain Amara forest which is separated from the first series of Dernaya by Ain Bou Deries track;
- To the east: land of crops and forestry post Faider Remaïlia Sidi Baïssis;
- South: land of crops Henchir el Goussa, the Ennafd el Bagrat up the beautiful Henchir Houchet;
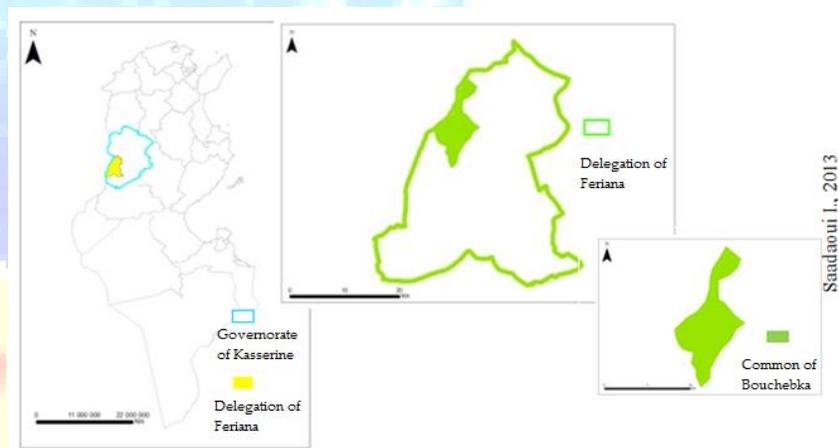- To the West: cropland between the forest and the Algerian border.

Figure 1. Geographical localization of the municipality of Bouchebka

2.1.2. Forests of Bouchebka: a compartment ecosystem anthropized

The series of national forests of Bouchebka; part of the great mass of Aleppo pines, located on the plateau between the Djebel Chambi and mountains Tebessa (Saadaoui, 2013), are located in the Governorate of Kasserine, Delegation Feriana (CRDA/D.F, 1995). They cover 16,991 ha or 82.27% of the total forest area in the delegation Feriana (Saadaoui et al., 2014b).

The covering by the vegetation seems to depend essentially on the action of the Man and on the herds (AEA / CRDA Kasserine, 1995).
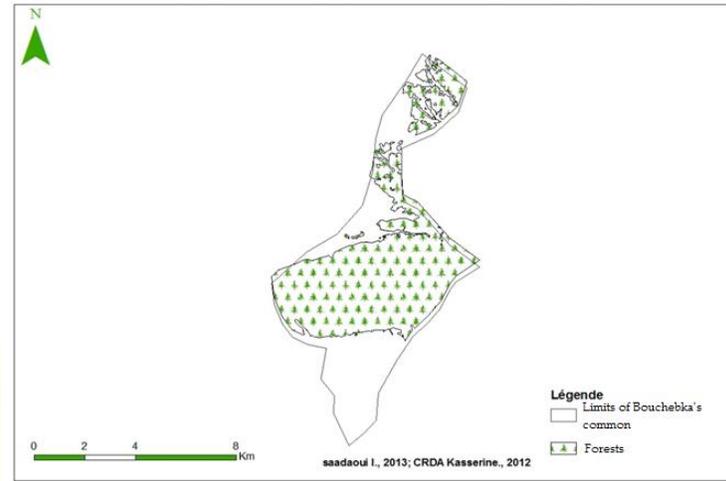
Figure 2. Distribution Map of forest area Bouchebka

2.2. Method

2.2.1. Field surveys

- **The aim of the investigations**

The main objectives of citizen surveys are seeking to know the nature of the resident's relations with its immediate environment, and to assess their level of knowledge in public policy planning and preservation of forest lands.

It seeks to make an economic evaluation to define the value attached to natural areas in order to support reasoning about the amount of financial resources to devote to their protection, and help policy makers and managers of natural areas to argue the merits of a policy of protection. It should also provide a basis for evaluative reasoning about public policy considered (Maresca et Dujin., 2008).

- **Perceived global of the type of information obtained thanks to the questionnaire**

The survey was realized during April and May, 2013, with 50 interviewees of the region of study. We proceeded to the census further to meetings for the direct interview; the duration of inquiries was between half an hour and two hours in the zone of study.

The questionnaire asked notably allows obtaining the following information:

- A willingness to pay for improving the economic and environmental value of the area,

- Altitude with respect to the protection of the environment,

- The relationship between respondents and their environment.

Besides, the questionnaire allows collecting numerous socioeconomic characteristics concerning the interviewees. These variables are useful for analyses to be realized.

For the contingent valuation method, variables are explanatory variables of the differences of willingness to pay.

The socioeconomic variables supplied by the questionnaire put on the western region of Tunisia are the following ones: the gender, the year of birth, the marital status, the level of studies and the perimeter of residence.

- **Structure of the questionnaire**

The questionnaire was structured in four parts:

- The first part concerns the general characteristics; it aims at knowing the place of the main residence of the interviewees to distinguish the residents of not residents, she allows collecting the socioeconomic variables appropriate to every individual.

- The second part raises the problem of the evaluation of the environmental good to be valued (the western forests Tunisian) through the willingness to pay to know the attitude of the interviewees to the environmental protection of their region.

- **The perusal of the data of inquiries**

To analyze our data of a survey, we opted for a descriptive statistical treatment. We made the data processing on Excel to build explanatory graphs of the meditative results. To estimate explanatory variables we resort to the logistic modelling, and to calculate the average WTP (willingness to pay) we resorted to the linear regression for the software XLSTAT on 2013.

3. Results

3.1. Socioeconomic characteristics of the interviewees

3.1.1. Distribution of the visitors according to the gender

The study concerns a sample compound of 50 people. The distribution by gender was not egalitarian (66 % man against 34 % woman that is 17 women and 33 men).
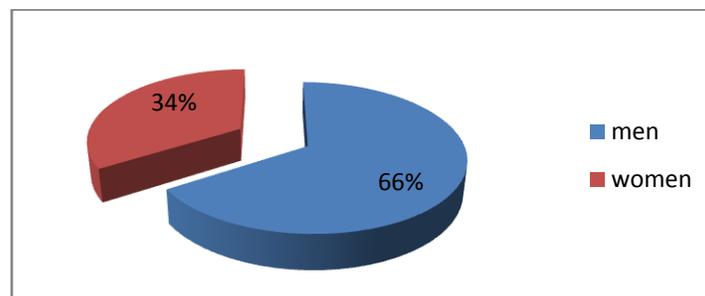
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Figure 3. The distribution of the interviewees according to the gender

3.1.2. Distribution of the sample according to age groups

All of the interviewees gave the information about their age. The figure 4 shows the distribution according to the age groups. Interviewees belonging to the age group between 20 and 40 years are the most frequent, this class presents 54 % of interviewees (27 people). Those that their old upper to 40 years represent 30 % (15 people), those who are under 20-year-old (8 people) represent 15 % of interviewees.
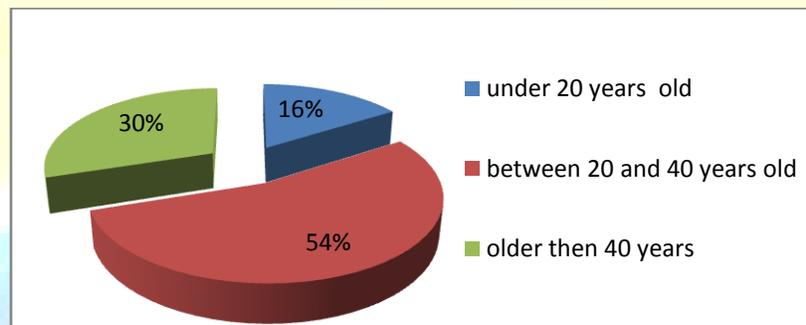

Figure 4. Distribution of the interviewees according to age groups

3.1.3. Educational Level

Outcomes of the survey show that 42 % of the interviewees have a level of secondary study (21 interviewees), 34 % have an upper level (17 people), 14 % have a primary level (7 interviewees), the rest of the interviewees was not at the school (10 %).
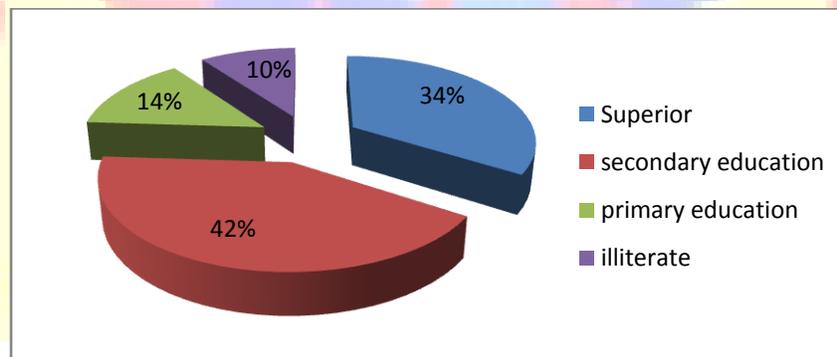

Figure 5. Distribution of the interviewees according to their educational levels

3.1.4. Monthly Average income

To simplify the analysis, slices were grouped in four classes (no income, 0 returned 800 dt, [800-1200 dt] and upper to 1 200 dt).

So, we find that 46 % of the interviewees have a lower monthly income or equal to 800 dt (23 interviewees), 10 % of the interviewees between 800 and 1 200 dt (5 people), 4 % of the

interviewees have a level of the higher income in 1200 dt (2 interviewees), the rest (20 interviewees) have no income (40 %) for various reasons, whether the interviewees are housewives or whether they are increased and unemployed, either they are still in school.
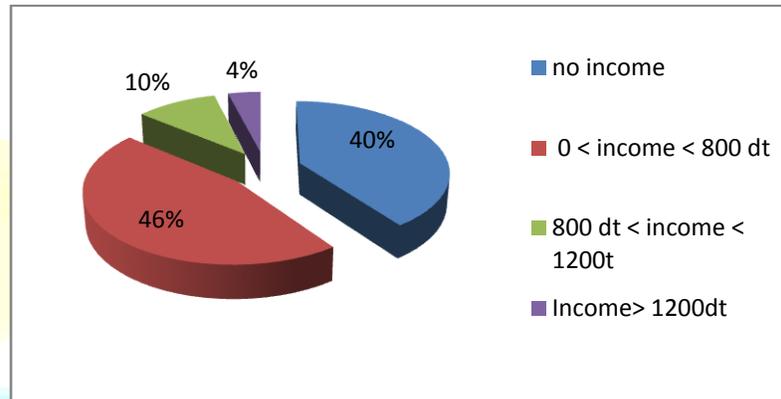

Figure 6. Distribution of respondents according to their income

3.1.5. Perimeter of residence of interviewees

Respondents belong to three different perimeters; the study site (Bouchebka), neighboring perimeters [rural areas near the study area] and urban area [nearby cities]. 54% of respondents are from the perimeter of the study (27 people), 32% of the neighboring area (16 respondents) and 14% of urban areas (7 interviewees).
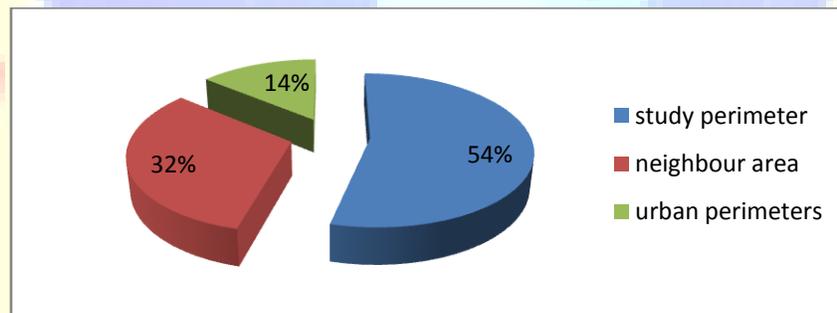

Figure 7. Distribution of respondents according to their perimeter of residence

3.2. Revelation of willingness to pay (WTP)

3.2.1. Analysis of responses submitted values

For dichotomous choice, the 50 people interviewed responded. 45 people have agreed to pay a given value or 90% of the 50 respondents.

Four types of values were given on the questionnaire. These values are in dinars: 2500, 5000, 10000, and 20000. The distribution is structured as follows for the 50 respondents. Five people

refused to participate or 10% of respondents. 23 individuals (46%) responded agreeing to participate with 2.5 dinars. 11 respondents are willing to pay five dinars (22% of 50 respondents). Six people have agreed to give a sum of 10 dinars (12% of 50). And five agree to pay 20 dinars (10%). The total consents that respondents are willing to pay is equal to 272.5 dinars.

The analysis of results reveals that the acceptance rate decreases when increasing the value offered.

Figure 8. Distribution of answers according to willingness to pay offered.

3.2.2. Willingness to pay according to some socio-economic variables

Willingness to pay according to age groups

- For the age group under 20 years (16% of respondents), the average pay per individual is equal to 0,937.5 dinars. Three respondents accepted 2,5 Dt; five others have refused to participate with any value.

- The average willingness to pay per person for the age group 20-40 years is 130 dinars, 27 individuals are concerned, they all responded positively to the securities offered (100%), 11 persons (40.7%) agreed to participate with 2.5 dinars, seven people have agreed to participate with a value of 5 dinars (25.92%), five respondents agreed with the value of 10 dinars (18.51%). The remaining four people accepted the proposal to pay a value of 20000 (14.81%).

- For the upper age group 40 years (15 people): The rate of positive responses is 100%. Means consent is 4.833 dinars.

- For respondents who are above 40 years age, there is only one respondent agreed to pay the value of 10 Tunisian dinars (6.6%), and another person agreed value of 20 Tunisian dinars (6.6%), 4 persons have accepted the value 5 dinars (26.6% of respondents). And 60% of individuals in this class have agreed to pay a consent equal to 2.5 dinars.

Figure 9 show that the actual acceptance to pay consent decreases with the increase of the proposed value. We also note that the highest average willingness proposed by individuals who are aged between 20 and 40 years. This is consistent with reality because most respondents are either still unemployed or they are retired.
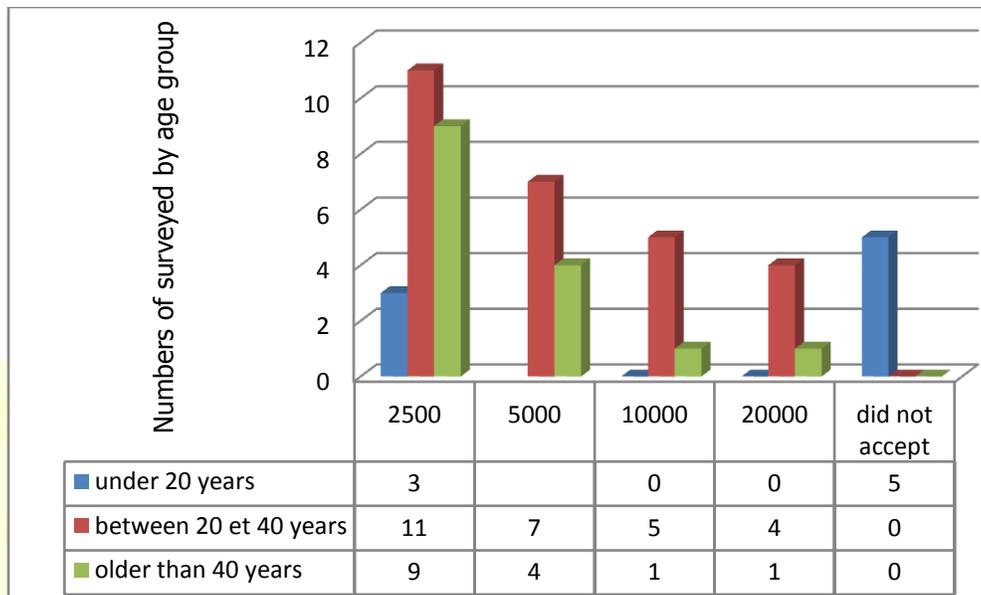
	2500	5000	10000	20000	did not accept
under 20 years	3		0	0	5
between 20 et 40 years	11	7	5	4	0
older than 40 years	9	4	1	1	0

Figure 9. Variation in the number of positive responses by age group and the proposed consent

Willingness to pay by gender

The rate of positive responses prevails for women: 94% of women have accepted the idea of participating in consent for the creation of a park while only 83% of men have accepted the idea.

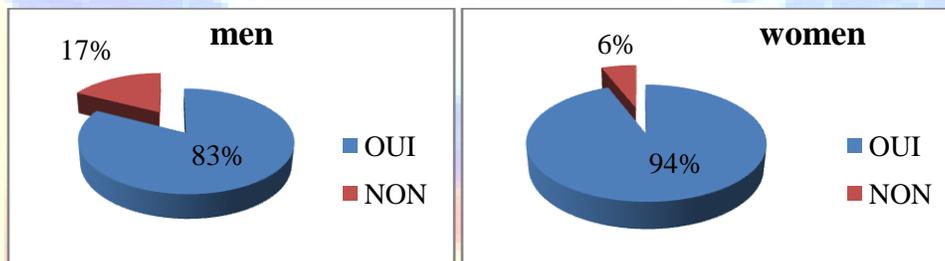**Figure 10.** Acceptance rate of willingness to pay by gender

Willingness to pay by level of education

Figure 11 show that the rate of positive responses depends on the level of education. We note that respondents who have a level of study are more superior to accept the idea of creating an ecological leisure park in the study area and subsequently, they have the highest acceptance rate payment.
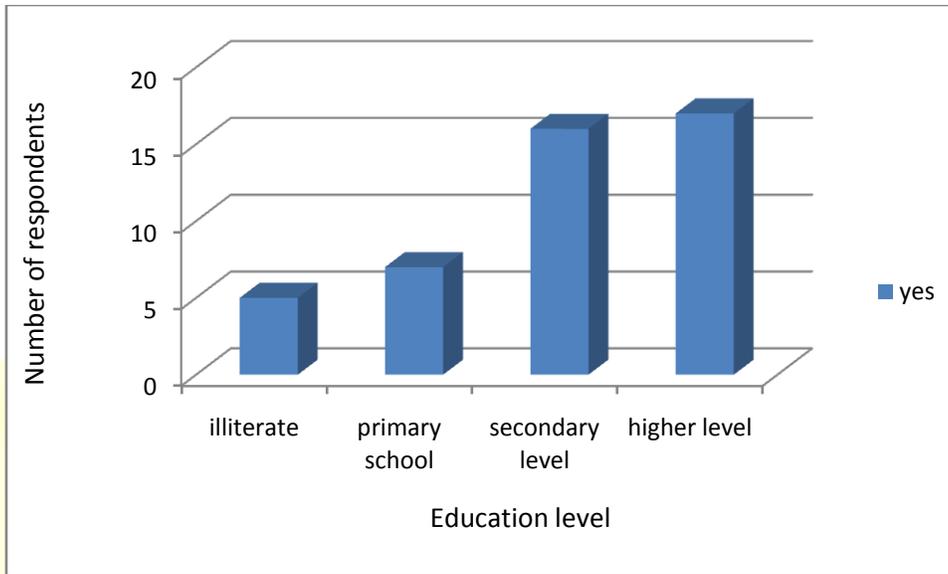
Figure 11. Variation acceptance rate to pay according to the level of instruction

Willingness to pay according to income classes

Person's with a high monthly income between 800 and 1200 Dt (23 people) are willing to pay on average twice the average value of the class of previous income. The average willingness to pay for the class of 1200 Dt income is almost double the previous class.

The remark is that the average willingness that the interviewees are ready to pay increase when we pass of a class from income to another one higher.

Figure 12. Variation of the average willingness to pay according to income classes

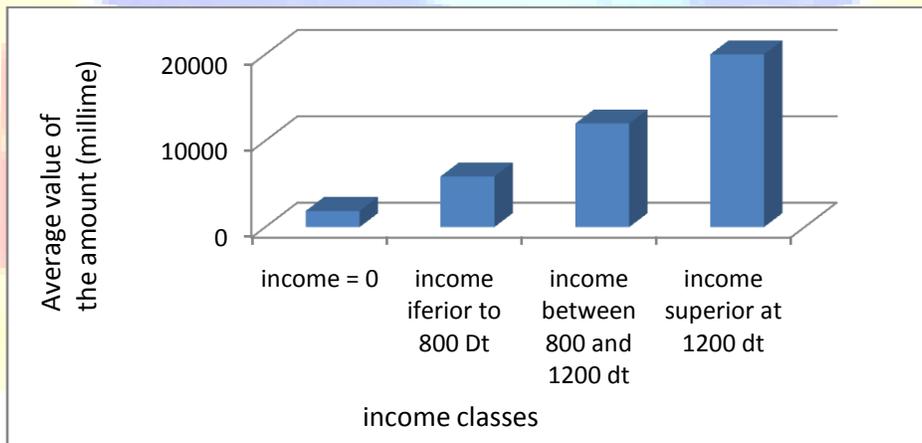### 3.3. Determinants of willingness to pay of respondents

Factors influencing the respondent to accept or reject the proposed amount are analyzed taking into account the complexity of the nature of the service to be evaluated. The finding of a consistent relationship between these factors and the statements of the WTP is necessary to ensure the validity of the theoretical economic evaluation provided. Before presenting the results, a presentation of all the factors used as variables in the model is made.

3.3.1. Presentation variables modeling

Table 1 summarizes the description of the independent variables and the dependent variable for modeling.

Table 1. Variables logit model.

Variable	Note	Description	Coding
1- Dependent variables			
Willingness to Pay	WTP	Variable à dichotomous choice : Are you willing to pay ?	Yes = 1 NO = 0
2- Independent Variables			
Education Level	Educ	Multinomial Variable by level of education	Superior levels = 1 Other = 0
Average monthly income	Revmm	Classe of average monthly income	1-0 dt 2-[0-800dt] 3-] 800 dt- 1200 dt] 4-plus de 1200 dt
Gender	Gender	Variable	1-men ; 2-women
Perimeter: (study area, neighbors perimeters, Townsites)	Perm	Dichotomous Variables	1- Study area 2- Other

3.3.2. Analysis of the determiners of the WTP

To resolve the model Logit we made appeal to the software XLSTAT on 2013. The table 2 gives the results of the estimation of the explanatory variables of the WTP. The model is globally significant and sturdy because the statistics of the probability of the global model is zero. (Prob > chi2=0.0000). The significance of a variable is accepted if its probability is lower than 5 %.

A positive sign of a dichotomous variable means that the probability of accepting the proposed amount is greater for visitors with condition 1 of the variable in question for those with the modality 0. This result is reversed in the case of coefficient negative. Regarding the continuous variable, A positive coefficient shows that for a given auction and a given level of the other

variables, the proportion of people surveyed accepting the offered value increases as the variable in question increases.

The signs of the parameters are consistent with economic theory. Insofar as the probability of accepting the submitted value increases with income and decreases with the value of the proposed amount.

Table. 2. Descriptive Statistics of the dependent variable

Variable	Modalities	Number	%
WTP	0	5	10,000
	1	45	90,000

Generated by XLSTAT from survey data

Table. 3. Descriptive Statistics of independent variables of CAP by the Logit model

Variable	Observations	Minimum	Maximum	Average
Gender	50	1,000	2,000	1,340
Old	50	14,000	50,000	31,020
Educatif level	50	0,000	1,000	0,340
Average monthly income	50	0,000	3,000	0,780
Residence perimeter	50	1,000	2,000	1,460

Source: Generated by XLSTAT from survey data Income class

Over 1200 Dt acts positively on the WTP unlike other classes that are not significant. More the income is high, the WTP is great. The analysis of the sign of the variable gender shows that women are more willing to accept the tendered amount as men. They are then more susceptible to program creating an ecological park.

Individuals in the study perimeters are willing to pay a lower rate than another interviewee.

The level of education is positively correlated with WTP. More the individual has a high level of education, the more he is willing to pay a higher value (Figure 13).

Table 4. Standardized coefficients (Variable WTP)

Logit estimates	Sum of observations = 50
Prob>Chi² = 0.0000	R² = 0.042

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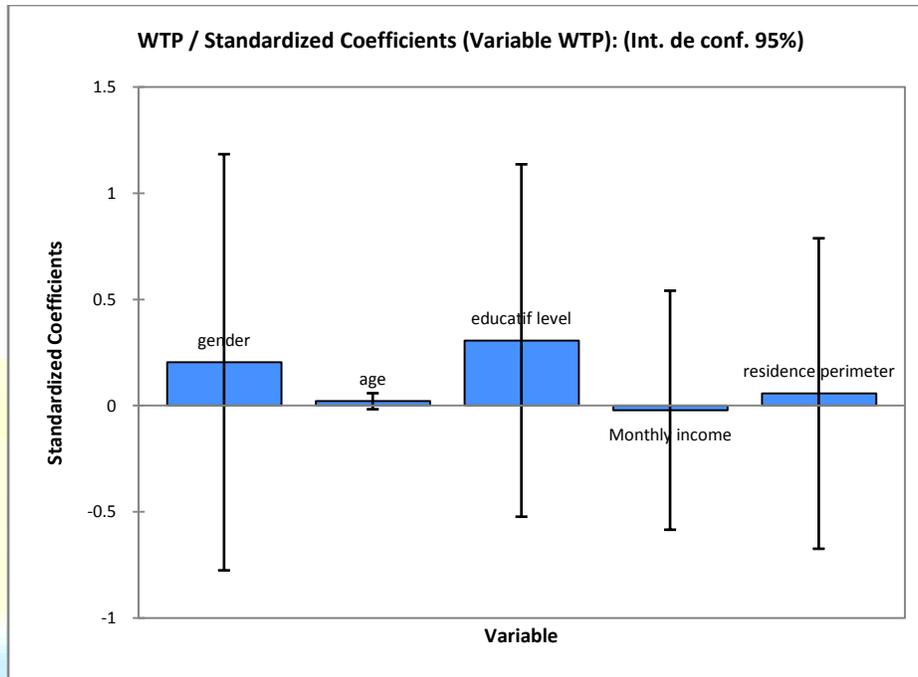http://www.ijmra.us

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Figure 13. Correlation between the average WTP and socioeconomic variables

3.3.3. Estimation of the value of the WTP by the Middle Linear Model

The quantitative approach is to estimate the value of the average WTP of respondents. The independent variables are the same as that of qualitatively. Resolution of average WTP will be made by the linear model in XLSTAT. The policy implications are announced after the presentation of the results of the mean WTP. The econometric treatment of the linear model on a sample of 50 people, giving an average willingness to pay 272 5 Dt

Table 5. Descriptive Statistics

Variable	Observations	Minimum	Maximum	Average
CAP	50	0,000	20000,000	5450,000
Gender	50	1,000	2,000	1,340
Old	50	14,000	50,000	31,020
Educatif level	50	0,000	1,000	0,340
Average monthly income	50	0,000	3,000	0,780
Residence perimeter	50	1,000	2,000	1,460

Source: Generated by XLSTAT from survey data

The average willingness to pay of respondents (5,450 Dt) represents 2.18 times the average value of consent of those who agreed to pay only DT 2.5 and 1.09 times the value of consent 5 DT.

Table 6. Presentation of the results of calculation by the WTP Middle linear model

Source	Value	Lower bround (95%)	Upper bround (95%)
Constant	0,000		
Gender	0,006	-0,164	0,176
Age	-0,114	-0,280	0,053
Educatif level	0,262	0,061	0,462
Average monthly income	0,555	0,301	0,809
Perimeter of residence	0,199	0,019	0,378
Number of observation		50	
Average WTP		5450.000	
R²		0.685	
F		47.172	
Pr>F		<0.0001	

Source: Generated by XLSTAT from survey data

Discussion

The study shows that respondents are willing to pay the consent to an average value which exceeds 5 Dt to benefit from the services of the park.

The least likely to accept a program involving a financial contribution individual defines themselves otherwise, through socio-demographic characteristics. Least likely to pay are individuals aged over 50 years. With these features, in addition to others that form a coherent whole: a low level of education, low incomes. The largest differences appear on the criterion of age and the level of degree.

Furthermore, the study highlights the relevant factors pertaining to the behavior of visitors. And to increase the value of the region some measures must be taken and are as follows:

- The need for investment in the region; the results show that 57% of respondents suggested investment in terms of infrastructure planning or entertainment, they will be useful later for the diversification of service delivery ecological leisure park.

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- The application of the methodology to the study area would estimate the following socio-economic characteristics of respondents average WTP. This approach will have a good economic tool to implement a system for collecting donations to create projects in border regions.

WTP values show that the willingness to pay higher are the result of the middle classes, i. e. mainly individuals whose level of education than the tray and the income level is less than 1200 DT / month.

Conclusion

In our study, we started from the premise that the quality management of transboundary landscapes has become a major problem. From a changing environment, the situation of the scenery of the mountains on the border Tunisian-Algerian requires consideration of the landscape as an object with multiple uses. But the landscape is today recognized by all as an object of negotiation or as part of land management in addressing issues raised by the development of our society. Moreover, the political landscape can no longer ignore public opinion in a movement for the protection and identity claim louder, anticipates future landscape transformations (Sirix, 2003).

The study was used to measure the number of indicators that could help assign an economic value to the area mountains Bouchebka. Consent is affected by the study, income and education level perimeter. The imperative of intergenerational equity requires the transmission of collective goods, and sustainable for future generations by ensuring the needs of the present efficiently.

Under these conditions, the joint analysis can support the reasoning leading to the economic evaluation of public policy and public decision to equip its arbitration on the allocation of resources.

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