

# SUSTAINABLE TOURISM IN INHAMBANE-MOZAMBIQUE

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## Abstract / Resumo

This paper analyses the role of sustainability in promoting tourism development in sub-Saharan Africa using data from a questionnaire undertaken in Inhambane province, Mozambique in 2010, a region that adopted a tourism strategy to promote growth. A mixed logit regression is adopted. Policy implications of the research findings are discussed.

**Keywords** Tourism, Sub-Sahara-Africa, Sustainability, mixed logistic

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## 1. INTRODUCTION

This paper analysis sustainability in promoting tourism development in Mozambique Inhambane-Mozambique with data from a questionnaire undertaken in local in 2010 and asking the locals about the sustainability of the tourism strategy. Research on African tourism is based in conceptual analysis (Dieke, 2000; Short, 2008), macroeconomic focus (Cuñado and Pérez de Gracia, 2006), hotels efficiency analysis (Barros and Dieke, 2008; Barros, Dieke and Santos, 2010) and questionnaire data (Gartner and Cukier, 2011). Therefore the present research adopts this last approach to analyse the relation between sustainable tourism in tourism development in Africa adopting questionnaire data and estimating a mixed logit model to explain the causality between tourism development and sustainability.

The motivations for the present research are the following: First, Nampula in northern Mozambique is a region specialized in tourism, aiming to improve the human development in the region through employment and other tourism receipts which adopted a tourism strategy. The aim of the questionnaire is to evaluate how tourism strategy has succeeded in promoting individual perceptions of tourism sustainability and development through tourism (Virtanen, 2005). Second, Tourism analysis with questionnaire data is common in tourism research (Barros, Correia and Butler, 2008) but using data generated in Europe. Therefore, this paper innovates with a questionnaire undertaken in Inhambane-Mozambique. Finally, the importance of tourism for economic and social development in the African continent – in the second half of the 20th century – is well documented (Dieke, 2000) with a conclusion that only African countries that have adopted a tourism strategy are converging towards the US real product per capita (Cuñado and Pérez de Gracia, 2006). This finding underlines the need for tourism to be taken more seriously by the African countries when thinking in terms of growth. This paper assumes that tourism contributes to real product per capita growth, (Cuñado and Pérez de Gracia, 2006) but test the sustainable tourism hypothesis, as it is perceived by the residents. This exercise is based in the economic idea that income and growth per se does not signifies long range growth and a sustainable tourism development strategy is need for the long range result (Bagheri, Hjorth, 2007; Keitumetse, 2011).

The paper is organized as follows. After this introduction the second section presents the contextual setting. Then section 3 presents the literature survey, followed by the methodology in section 4. Section 5 presents the hypothesis. Section 6 presents the data Section 7 present the results and finally the 8 section present the discussion and conclusion.

## 2. CONTEXTUAL SETTING

Tourism in Africa as a way to promote human development is an active public policy adopted by many countries in the end of twenty century. In an empirical test, Cuñado and Pérez de Gracia, (2006) concluded that only African countries that have adopted a tourism strategy are converging towards the US real product per capita. Mozambique has adopted tourism strategy to develop several areas without any other resource. Inhambane in south part of the country is a coastal region near the capital at 460 km and specializing in tourism. Mozambique is situated in oriental coast of Africa with an area of 799 380 km<sup>2</sup>, with Tanzania in north, Malawi and Zambia in west and South Africa in southwest and the Indian sea at east. Mozambique is tropical with regional variations. Mozambique is administrative divided in three regions: North (provinces of Cabo Delgado, Nampula and Niassa), Centre (Sofala, Manica, Tete and Zambézia) and south (Maputo city, Maputo province, Gaza and Inhambane). Tourism in Mozambique is concentrated in south part which concentrates around 50% of total beds. Inhambane city in is the capital of the province of Inhambane with 65.249 inhabitants and 80% of poverty rate. In this context the government launched “Pro-poor Tourism” strategy aiming to reduce the poverty rate in long range. Table 1 presents the number of tourism activities in Inhambane:

**Table 1: Tourism indicators in Inhambane in 2010.**

	Tofo beach	Barra beach	Inhambane centre
<b>Lodges</b>	27	45	0
<b>Hotels</b>	1	0	2
<b>Pensions</b>	2	2	5
<b>Restaurants</b>	3	2	40
<b>Number of rooms</b>	433	1171	86
<b>Number of beds</b>	943	2570	170
<b>Number of travel agencies</b>	1	0	2

The city is organized around a bay with two beaches (Tofo and Barra) in each side and a city in the center. The tourism indicators indicates this is a small tourism area, but very important for the local economy.

### 3. THEORETICAL BACKGROUND

Tourism and sustainability is a theme that attracted some research so far, Bahadur and Seeland (2009). Jobs generated by Tourism are spread across the economy - in retail, construction, manufacturing and telecommunications, as well as directly in travel and Tourism companies, Arrow et al. (1995). These jobs employ a large proportion of women, minorities and young people; are predominantly in small and medium sized companies; and offer good training and transferability. Therefore tourism is clearly a way to develop social development, (Cuñado and Pérez de Gracia, 2006). Regarding sustainability, the 1992 United Nations Conference on Environment and Development (UNCED) and the Rio Earth Summit, identified Travel and Tourism as one of the key sectors of the economy which could make a positive contribution to achieving sustainable development, leading to the adoption of Agenda 21, a comprehensive program of action adopted by 182 governments to provide a global blueprint for achieving sustainable development. Since then there has been a steady growth in environmental good practice across the industry such as airlines and airports reducing pollution and noise impacts; cruise liners practising marine conservation; hotels implementing energy consumption and waste disposal programs; car rental companies investing in increasingly fuel efficient fleets and railways sound proofing to dampen noise, Bender, Johnson and Simonovic (1994). Based on this trend a questionnaire was undertaken in Inhambane-Mozambique asking the residents about their awareness on tourism sustainability. International tourists should view the spectacular natural composition on Inhambane environment, whilst being responsible, respectful and considerate of local communities, Anderies (2000). Engaging local people on sustainability, it is hoped that tourism will serve to increase local communities' awareness of their natural environment whilst providing them with alternative sources of income Therefore this paper contributes for this research analysing perceptions of residents in Inhambane, Mozambique on tourism and its capacity to contribute positively for human development.

### 4. LITERATURE SURVEY

Examples of tourism studies that use the binomial logit model include Fleischer and Pizam (2002) who determined the constraints of senior Israeli tourists; De la Viña and Ford (2001) who described the demographic and trip factors of potential cruise passengers based on a sample of individuals who previously requested travel information; Costa and Manente (1995) who investigated the characteristics of visitors to the city of Venice with respect to their origin and socio-economic profile, their preferences and their holiday decisions; Sheldon (1995), who examined the travel incentive among U.S. corporations; and Stynes and Peterson (1984), who proposed a

logit model to estimate recreational choices. Kockelman and Krishnamurthy (2004) proposed a micro-economically rigorous method to characterize travel demand across a great variety of choice dimensions, including trip generation. Their study applied a multivariate negative binomial model for trip demand functions derived from an indirect underlying translogarithmic utility function. Both time and money budgets were incorporated into the model structure via an effective or generalized budget constraint. A nested logit model of trip mode and destination was used to calculate the effective prices for each trip proposed via nested logsum expressions. Ledesma *et al.* (2005) used a left truncated Poisson and a binomial logit model to analyse the repeat visitation in the Island of Tenerife, and Hellström (2006) used an inflated truncated bivariate Poisson lognormal model to analyse the households' choice of overnight stays. Other related studies include Palmer-Tous *et al.* (2007) who used several count data models (Poisson, negative binomial, zero-inflated Poisson, zero-inflated negative binomial, truncated Poisson, zero-truncated negative binomial) to analyse the use of hire cars by tourists in Mallorca, Spain, and Moran *et al.* (2006) who also presented several count data models (negative binomial model, zero truncated negative binomial, negative binomial with truncation and endogenous stratification) to estimate the recreational value of mountain biking sites in Scotland. The authors concluded that correcting for endogenous stratification in addition to over-dispersion and truncation is needed to avoid biased results. Related studies on Africa include Barros, Correia and Butler (2008) that analysed Portuguese tourism in Africa with a mixed logit model. From this research it is verified that there is none published paper using questionnaire data from African sub-Saharan, neither the focus on tourism sustainability. Research on tourism sustainability includes Butler (1980, 1991); Brown, Turner, Hameed and Bateman (1996) Bahadur and Seeland (2009).

## 5. METHOD

The problem of eliciting truthful answers to sensitive questions is an age-old problem in survey research. In Africa respondents tend to report questions in a way that sometimes seems they do not understand clearly the question due to the low level of education. To combat such response bias, various techniques can be adopted such the randomized response technique, Fox and Tracy (1986) and the mixed logit regression is adopted (Train, 2004, Hole, 2007).

Consider the Inhambane resident that was asked to answer a questionnaire on tourism and sustainability in his/her city. The main goal is to determine the probability of a resident to declare that tourism in Inhambane improves sustainability tourism or not, given some characteristics, denoted by the vector  $x_i$ . Define a binary random variable  $y_i$ , which verifies  $y_i = 1$  if the resident declares that tourism improves sustainability and  $y_i = 0$  if the resident declares tourism do not improve sustainability, then the aimed

probability is  $P(y_i = 1/x_i)$ . Models to determine the probability of an event given a set of characteristics,  $x_i$ , can be derived based on a latent variable,  $y_i^*$ , that is not observed and verifies

$$y_i^* = \beta' x_i + \varepsilon_i, \quad (1)$$

where  $\beta$  is a vector of unknown parameters, and  $\varepsilon_i$  is an unobserved random variable allowing that individuals with the same characteristics,  $x_i$ , have different outcomes. To use the general framework of binary dependent models, let us simply suppose that  $y_i = 1$  if  $y_i^* > 0$  and  $y_i = 0$  if otherwise. Then  $P(y_i = 1/x_i) = P(\varepsilon_i > -\beta' x_i)$  and the desired probability depends on the statistical assumptions about  $\varepsilon_i$ . When  $\varepsilon_i$  is independent and identically distributed as extreme value type I, the above probability is given by the highly popular logit model,

$$P(j = 1 | x_i) = P(\beta, x_i) = \frac{e^{\beta' x_i}}{1 + e^{\beta' x_i}} \quad (2)$$

Ben-Akiva and Lerman (1985), and Train (1986) used the logit model to relate the probability of making a choice to a set of variables reflecting decision maker preferences.

The mixed logit, also called random coefficients logit (RCL), relaxes the assumption that the coefficients are the same for all terrorist events, allowing for some heterogeneity in the way the characteristics of the attack determine the probability of resulting victims that are USA citizens. For the RCL model, an event  $i$ 's coefficient on some characteristic  $j$ ,  $\beta_{ij}$ , is a random draw from some distribution where the family of the distribution is specified, but the mean and variance are unknown and have to be estimated. We consider  $\beta_{ij} \equiv \mu_j + \eta_{ij}$  with  $\eta_{ij}$  independent of  $\varepsilon_i$ , having zero mean, variance  $\sigma_j^2$  and distribution  $F$ . When  $F$  is symmetric, it is usually assumed to be the normal distribution, (Revelt and Train, 1998; Mehndiratta, 1996; Ben-Akiva and Bolduc, 1996), and less often, the uniform or triangular distribution. (Revelt and Train, 2000; Hensher and Green, 2001, 2003; Train, 2001). If, for example, the coefficient can only adopt positive values with asymmetric distribution,  $F$  is usually log-normal. Siikamaki (2001) and Siikamaki and Layton (2001) use the Rayleigh distribution (Johnson et al., 1994), which is on one side of zero like the log-normal but, as these researchers found, can be easier for estimation than the log-normal. Revelt (1999) used truncated normals. Finally, the aimed probability is equal to,

$$P(y_i = 1 | x_i) = \int_{-\infty}^{+\infty} \dots \int_{-\infty}^{+\infty} P(\beta, x_i) f(\beta | \mu, \Sigma) d\beta, \quad (18)$$



with  $f$  as the joint density of the  $\beta_{ij}$ .

Usually some restrictions are imposed, namely that the coefficients are not correlated, which amounts to estimate only the  $\mu_j$  and variances  $\sigma_j^2$  ( $\Sigma$  is a diagonal matrix). Exact maximum-likelihood estimation (MLE) is not possible, since the integral cannot be calculated analytically and requires simulation. One appealing approach uses developed techniques for simulating probabilities (Train 2003), which make feasible to estimate such models. Applications include Train (1998), Revelt and Train (1998), McFadden and Train (2000) and Rouwendal and Meijer (2001).<sup>2</sup> Note that (18) is the expectation of the logit  $P(\beta, x_i)$  in (14) for  $\beta$  random, so that it can be calculated by summing over  $R$  simulated  $P(\beta_i^r, x_i)$  with  $\beta_i^r$  drawn from  $f(\beta | \mu, \Sigma)$ . These draws can be obtained randomly using a pseudo-random generator, though, more recently, systematic methods, such as Halton draws, have proved to be more efficient (see Train 2003 for further details). The simulated probability is:

$$SP_i = \frac{1}{R} \sum_{r=1}^R P(\beta_i^r, x_i), \quad (19)$$

where  $\beta_i^r$  is the  $\beta_i$  from the  $r^{\text{th}}$  draw from  $F(\beta | \mu, \Sigma)$ , for event  $i$ , and  $R$  is the number of draws. Thus, the simulated log-likelihood function for the RCL is:

$$SL = \sum_{i=1}^N \log \left[ SP_i^{y_i} (1 - SP_i)^{1-y_i} \right], \quad (20)$$

which depends on  $\mu$  and  $\Sigma$ . The maximum-likelihood estimates of those parameters (given their chosen initial values) are obtained with iterative numerical optimization procedures (see Train 2003 and Hensher and Greene 2003 for further explanations).

## 6. RESEARCH HYPOTHESIS

The aim of this paper is to test whether the tourism in Inhambane, Mozambique promotes sustainability asking the subjective perception of Inhambane residents. Sustainability aims to develop capabilities of the population environment, Brown, et al. (1996). This concept signifies that there is sustainability is needed for long range development. The subjective opinion on the contribution of tourism for sustainability can be explained by several factors. Perceptions the interviewees developed in their day life which are theoretical supported in Fishbein and Ajzen's (1980) theory of reasoned action (Baker

<sup>2</sup> Improvements in computer speed have allowed the full power of mixed logit models to be utilized. Among studies showing this power are those by Bhat (1998) and Brownstone and Train (1999) on cross-sectional data, and Erdem (1996), Revelt and Train (1998) and Bhat (2000) on panel data.



and Crompton, 2000), as applied in management and economics research, and the role theory of tourism behavior (Pearce, 1982; Yannakis and Gibson, 1992) from the perspectives of sociology and ethnography. Both theories take into account different variables to explain tourism subjective opinion and decision. The questionnaire respondent on tourism issues is regarded as a rational individual who decides on its opinion, conditioned by previous experience (Howard and Sheth, 1969). This assumptions highlights the importance of resident rational decision and previous experience on tourism activities.

The survey questionnaire therefore gathered data pertaining to: 1) socio-economic demographic variables including income; 2) destination attributes, and 3) satisfaction (overall satisfaction and specific satisfaction). Using the survey data on these characteristics, we tested the following hypotheses:

*Hypothesis 1 (Socio-economic characteristics):* the resident tourism subjective opinion relating tourism and tourism sustainability is function of individual socio-demographic characteristics such as age, gender, education and working status (Goodall and Ashworth, 1988; Woodside and Lysonski, 1989; Weaver *et al.*, 1994; Zimmer *et al.*, 1995) supporting the hypothesis: H1: tourism sustainability perception is positively related with socio-economic characteristics of the respondent.

*Hypothesis 2 (Income):* the resident tourism subjective opinion relating tourism and sustianability is is a positive function of the individual's income. This is a traditional hypothesis in tourism demand models, in which price, income and budget constraints define the frontier of consumption possibilities for travel (Hay and McConnel, 1979; Aguiló and Juaneda, 2000; De la Viña and Ford, 2001; Nicolau and Más, 2005). H2: tourism sustainability perception is positively related with the income of the respondent.

*Hypothesis 3 (life in city):* the resident tourism subjective opinion relating tourism and sustainability is is a positive function of the life in city. City residents are more economic related that country residents and therefore more aware of the importance of tourism in regional activity. H3: tourism sustainability perception is positively related with life in city.

*Hypothesis 4 (Destinations improvments due to tourism):* the resident tourism subjective opinion relating tourism and tourism sustainability is is a positive function of of a destination's improvments due to tourism. H4: tourism sustainability perception is positively related with destination improvments.

## **Reliability, Validity, and Generalizability**

Several steps were taken to ensure the validity and reliability of the data. First, the point of departure was a questionnaire already applied to tourism (Barros, Correia and Butler, 2008), which was adapted for the present purpose, ensuring that prior research in the field had been considered and face validity established. Second, all relevant literature was taken into consideration. Third, the questionnaire was pretested on African students of tourism economics at the Technical University of Lisbon. Following the administration of the final survey, a stratified random subset of 50 respondents was contacted by phone and personal a second time to check if any problem persisted, but none were revealed. These procedures ensure the content validity of the questionnaire, signifying that it is likely to measure what it is intended to measure. Internal consistency was ensured by measuring the correlations among the variables. Reliability (internal consistency) of the scale used was analyzed with Cronbach's alphas of

the original item scale, ranging from 0.72 to 0.82. Convergent validity of the original scale was established using exploratory factor analysis (principal axis factoring with varimax rotation). Fourth, the questionnaire was used with a random sample, with a response rate of 80%, which was considered an acceptable sample of respondents (Fox and Tracy, 1986). This procedure ensures the generalizability of the data, meaning that the findings are applicable to a more general population. Fifth, the reliability of the data was examined, analyzing them extensive

## Survey

The questionnaires employed both open- and closed-ended questions to evaluate the sources of information, motivations, sociodemographic profiles, and tripographic variables using 7-point Likert-type scales, as suggested by Maio and Olson (1994). The questionnaire is based on the literature review and aims to collect data to analyze and investigate the defined hypotheses. The survey has three sections of questions. The first section assesses sociodemographic and tripographic variables, such as gender, occupation, the holiday's. The second section asks for perceptions on tourism effect on the economy.

## 7. DATA

Table 2 presents the data used in the model estimated. The general characteristics of these respondents were that they were male (52%), with an average age of 33. This profile leads to an overall definition of the responding respondent as individual inhambane citizen as young, with a family that includes at least one child. The hypotheses proposed above were tested by means of the adoption of the logistic regression for randomized response data that assumes that the probability of choosing

that tourism promotes human development instead not promoting can be described by a cumulative logit probability function of the exogenous variables  $X_i$ , Prob (choice/type). To estimate the logistic regression for randomized response data the article used the Stata 12.

**Table 2. Variable Characteristics**

Variable	Description	Minmum	Maximum	Mean	Std. Dev
<b>Dependent variable</b>					
Tourism improves sustainable environment	Binary variable which is equal to 1 if the resident declares he/she considers that tourism improves sustainable environment	0	1	0.94	0.232
<b>Socio-economic characteristics</b>					
Age	The respondent's age in years	15	70	42.35	10.392
Education	The respondent's age in years	0	12	7.28	3.80
Gender	The respondent's gender (male=1, female=0)	0	1	0.47	0.271
Employment	The respondent is employed in tourism activities, yes=1, no=0	1	0	0.25	0.743
<b>Income</b>					
Income	The respondent's income in Meticals	12000	2000	2817	1660
<b>Life in city</b>					
Life in city	The respondent's lives in city of Inhambane=1, other=0	0	1	0.37	0.484
<b>Destinations improvements due to tourism</b>					
Improvements-employment	The respondent's declares that there were improvements in the city due to tourism employment	0	1	0.96	0.427
Improvements-income	The respondent's declares that there were improvements in the city due to tourism in income	0	1	0.73	0.532
Improvements-transportation	The respondent's declares that there were improvements in the city due to tourism transportation	0	1	0.84	0.327
Improvement-taxes	The respondent's declares that there were improvements in the city due to tourism taxes	0	1	0.43	0.217

## 8. RESULTS

Table 3 presents the results. Model parameters  $\beta$  relate changes in the explanatory variables  $X_i$  to changes in the response probability. While the parameter signs indicate the direction of the relationship, they are not directly interpreted as marginal changes to the mean value of the dependent variable. This is because of the nonlinear form of the distribution function. Based on the global model, using the transformation  $100(e^\beta - 1)$ , it can be said that each additional income unit of the individual respondents yields an increase of about 97.801% in the likelihood of supporting that tourism promotes the perception of sustainability. The model fit the data well.

**Table 3 – Estimation results of standard logit and Mixed Logit**

Parameter	LOGIT		Mixed logit	
	Estimate	t-stat	Estimate	t-stat
C	-2.276	-6.58*	-2.093	-2.64**
Constant	-0.170	-4.73*	-0.159	-2.94*
Age	0.004	4.43*	0.004	2.89*
Education	0.708	2.11**	0.674	3.84*
Gender	0.572	3.31*	0.548	2.80*
employment	0.605	3.12*	0.577	2.57**
Income	0.181	3.65*	0.174	3.62*
Life in city	1.073	3.51*	1.011	3.40*
Tourism Improves employment	0.0287	4.83*		
Tourism improves income	0.0177	2.81**		
Tourism improves transportation	0.237	3.79*		
<b>Random parameters</b>				
Tourism Improves employment			0.0268	3.63*
Tourism improves income			0.0161	4.61*
Tourism improves transportation			0.2295	3.7*6
Observations	289		289	
LogLikelihood	-863.33		-864.29	
RESET on stand.	-3.251			

logit	(0.001)			
HALL on standard	21.317			
Logit	(0.000)			
LR standard vs. mixed	21.17			
	(0.000)			

Note: RESET = detects misspecification in the logit model and was performed with  $\beta^{\chi^2}$ ; HAL = detects evidence of heterogeneity in the logit model depending on random variables; LR = likelihood ratio test.

\*Statistically significant at 1%. \*\*Statistically significant at 5%.

The homoscedasticity of the error process is supported by the likelihood test. The Wald chi-square test rejects the hypothesis that the set of coefficients is not statistically different from zero at the 1% level of significance. The asymptotic Z-statistics indicate whether a particular parameter estimate is statistically different from zero, that is, if the variable has an impact on the perception that the tourism promotes human development in Inhambane. The probability of the perception that the tourism promotes sustainability in Inhambane is positively correlated and statistically significant with several exogenous variables. These differences mean that choosing that tourism promote sustainability rather than it does not promote sustainability is related to several exogenous variables that tourism authorities could use the conclusions from this article to differentiate their tourism strategy in order to improve its tourism environment sustainability.

## 9. DISCUSSION AND CONCLUSIONS

The paper analysed the determinants of tourism sustainability perception related to tourism in Nampula- Mozambique using a mixed logit regression for random response data. From the results it was clear that Hypothesis 1 is accepted because the socio-economic characteristics is positive and statistical significant. This result signifies that all socio-economic variables contribute positively for the subjective evaluation that tourism contributes to a sustainable environment in Inhambane.

Hypothesis 2 is accepted as income is positive and statistically significant, validating previous research using other modeling approaches (Barros and Assaf, 2011). Hypothesis 3 is not accepted as life in city is positive and statistical significant. This result signifies that citizens in Inhambane have a positive evaluation of the tourism sustainable environment contribution. Additional, we also accept Hypotheses 4 as destination attributes improvements seem to have a positive and significant impact on the

subjective evaluation of tourism contributing sustainable environment in tourism. This validates previous results on return (Cuñado and Pérez de Gracia, 2006).

The general conclusion is that African citizens evaluate positively the contribution of tourism sustainable environment. Thus, it seems clear that future policies in the Inhambane should focus on upgrading the contribution of tourism for sustainable environment, promoting investment in education, health that supplement the increase in income that tourism afford in the region. Thus, by combining and acting on these results, it is clear that there is an opportunity to refine policies to help increase the contribution of tourism for sustainable tourism environment. However, new tourism strategies are needed to re-positioning the contribution of tourism for sustainable tourism in the region. It might be also of potential value for tour operators to have a deeper insight into the variables that shape the decisions and perceptions of local individuals towards tourism and its contribution for sustainable tourism environment. With a greater awareness of what these individuals require from a tourism, operators and organisations can focus on those statistically significant variables determined in the model when focusing in increasing the contribution of tourism sustainable environment. The variables that increase the positive perception that tourism contributes to tourism sustainable environment should also be the focus of future tourism campaigns. Similarly, the variables that decrease the perception should be controlled and addressed in order to minimise their potential negative effect.

How does this paper compare with previous research? While this paper supports some traditional results such as that tourism contributes to tourism sustainable environment it presents a negative on education and health. A general conclusion is that local citizens seem to evaluate positively the contribution of tourism for sustainable environment. More research is needed to confirm this result.

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