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Environmental Education and Ecotourists: Experience from the Yucatan Coast, Mexico

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ABSTRACT

Ecotourism is a tourism modality intricately linked to the principles of sustainability, due to its natural offer component and environmental education. The objective of this research is to evaluate the perception of ecotourists present on the coast of Yucatan. From a regional approach, the author selected twenty-five community-based ecotourism ventures (CBET) present in the area and analysed the perception of ecotourists through a questionnaire and its respective statistical analysis with non-parametric tests, and developed a general profile of the ecotourist applying a sociodemographic segmentation and based on a geographical segmentation the author compared the perceptions of two populations: national ecotourists and international ecotourists. The data reveal that the profile of the ecotourist on the coast of Yucatan is similar to that postulated in the literature. In terms of environmental perception the author found a significant difference in both populations, and believed that this difference is because the international market is more critical and demanding. In addition, areas of opportunity were documented in the CBETs in the way they carry out their environmental communication. The author concluded that ecotourism in the region is still an activity in consolidation and although it presents great achievements. It is still not possible to qualify it as a sustainable activity. We call for continuing deepening the studies of ecotourism demand and evaluation of perception, through comparative, longitudinal studies and with new variables that allow new test statistics, to contribute new elements to the ecotourism debate.

1. Introduction

Ecotourism is a specialized modality of the tourism sector based on trips to places that present a good state of conservation or are protected sites, motivated by being in

contact with nature and admiring specific faunistic and floristic attributes. It is also one of the fastest-growing tourism segments in present days and is linked to the principles of sustainability^[1,2]. While it is true that the current COVID-19 pandemic is wreaking havoc on the tourism

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sector^①, it is also true that in a post-COVID scenario, the activity will resurge and the tourism market will look for less crowded destinations, such as ecotourism^[3].

Then ecotourism is a multifaceted activity requiring communication and collaboration among a diverse range of actors with diverse needs and interests^[4]. Two of the most representative elements of ecotourism are environmental education, which is the main differentiator of ecotourism concerning other modalities of nature tourism or alternative tourism^[5,6]. The other element is the ecotourist, since, being a specialized offer, the demand also tends to be specialized, since the ecotourist is a traveller with motivations and leisure needs quite different from the rest of tourists^[7,8]. However, most of the literature on ecotourism focuses more on issues such as environmental impacts, community impacts, conservation involvement, motivations, territorial struggles, resource control, and business management, among others, leaving aside these crucial elements of ecotourism^[9,10].

It is essential to highlight that although the theory considers linkages between ecotourism and sustainability^[1], many empirical studies show impacts of ecotourism in areas without environmental deterioration before tourism activity, so it is fundamental that all aspects of ecotourism are met^[11,12,2], including environmental education, because environmental education is the most crucial characteristic an ecotourism offers. However, there is a difference between education and interpretation, the former refers to a formal, structured, and systematic process^[13], in this format the guide plays a fundamental role since face-to-face communication accentuates the contribution that ecotourism makes in the receiving territory and can also be complemented with support material such as handbooks, brochures and other means to deepen the understanding of an environmental process^[6].

On the other hand, interpretation is more of a first-hand experience, it is a self-learning environment, although in this process the message can be misinterpreted or incomplete^[13].

The ecotourist is the essential element in the development of this economic activity since, without a consumer, the phenomenon cannot continue. The literature suggests that the major countries of origin of ecotourists are Western Europe, Japan, Canada and the USA, the bulk of whom are between 25 and 42 years of age, with high purchasing power and schooling, often accompanied by a consolidated environmental awareness^[4,7,8]. In this sense, identifying and distinct ecotourist types are beneficial for the planning, management, and marketing of ecotourism^[10],

although sometimes generalizing from a case study, from small samples or omitting certain factors in the analysis can generate certain biases in the elaboration of profiles and typologies^[14].

In this sense, the objective of the research is to analyse from a regional approach the demand profile, i.e., the ecotourists and their perception of the environmental education present in the different community-based ecotourism ventures (CBET) that offer this activity on the Yucatan coast. At the same time, it is proposed to elaborate an ecotourism profile based on demographic and socioeconomic segmentation criteria^[14], and to apply a geographic segmentation^[14] to compare the universe of demand in two populations, one national and the other international, to verify if there is a difference in the perception of environmental education in the CBETs analysed.

2. Study Area

Yucatan is a Mexican state, located in the northern portion of the Yucatan Peninsula, bordered to the west by the state of Campeche and the east by Quintana Roo (Figure 1), has a population of 2,320,898 inhabitants, and the coastal region has about 222,273 inhabitants, equivalent to 10.4% of the state total, scattered in a coastal strip of more than 340 km integrated by 13 municipalities^[15].

In the Yucatan shoreline, we find three diverse types of littorals: the sandy, composed of unconsolidated material, i.e., beaches and coastal dunes, which represent about 85% of the state's coastline. The vegetated, formed by areas covered mostly by perennial vegetation, mainly mangrove, account for about 13%, and the artificial coastline, characterized by human infrastructure either through dikes, walls or breakwaters, is equivalent to 2% of the total Yucatan coast^[16]. It should be noted that the mangrove is the most important plant community in the region, located in the coastal strands, coastal lagoons, wetlands, covering 73,893 ha, all of them under protection criteria (protected areas) in Mexico called Natural Protected Area (ANP, for its acronym in Spanish), two of federal character and three state indoles^[18,19].

Human occupation of the Yucatan coast is a recent phenomenon. During pre-Columbian Maya times, coastal settlements were minimal and were related to salt extraction. With the crisis of the henequen industry in the mid-20th century, an exodus from the interior of the state to the coast began. This process was called the "*march to the sea*", in which the state promoted colonization through the support of technician fishing, which sought an economic migration from agriculture to fishing^[20]. The decline of the fishing industry and the low viability of the area for agricultural exploitation led to the outsourcing of the

① At the time of submission of this article, some regions are facing the fourth wave of coronavirus infections.

economy. In this sense, ecotourism is an alternative with enormous potential since this activity is based on the exploitation of the landscape and environmental criteria, especially in territories that are under protection criteria since many activities are prohibited or restricted because they are ANP^[1,21].

The main ecotourism attractions on the Yucatán coast include mangrove landscapes dominated by red mangrove

(*Rhizophora mangle*), white mangrove (*Laguncularia racemosa*), black mangrove (*Avicennia germinans*), and buttonwood mangrove (*Conocarpus erectus*). As well as endemic herpetofauna such as the Mexican crocodile (*Crocodylus moreletii*) and endemic and migratory avifauna such as the pink flamingo (*Phoenicopterus ruber*), the roseate spoonbill (*Platalea ajaja*) and the stork (*Mycteria americana*), among others (Figure 2).

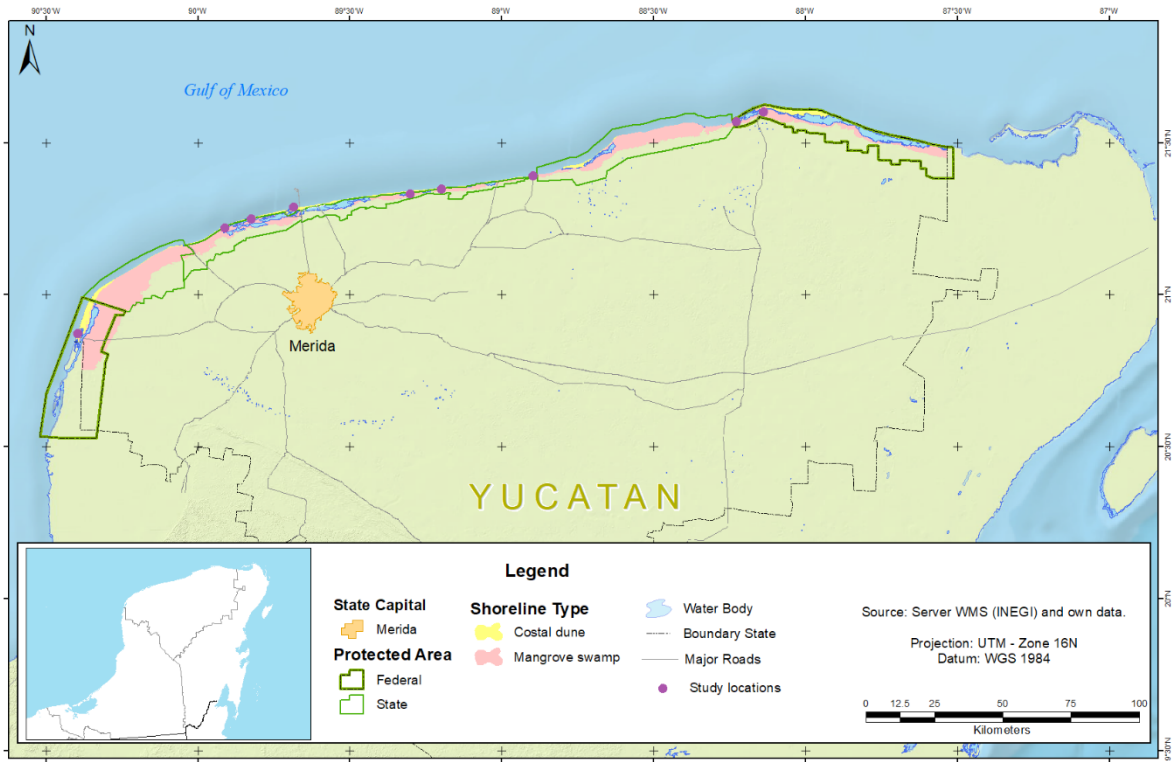


Figure 1. The study area (Yucatecan coast).

Source: Server WMS INEGI

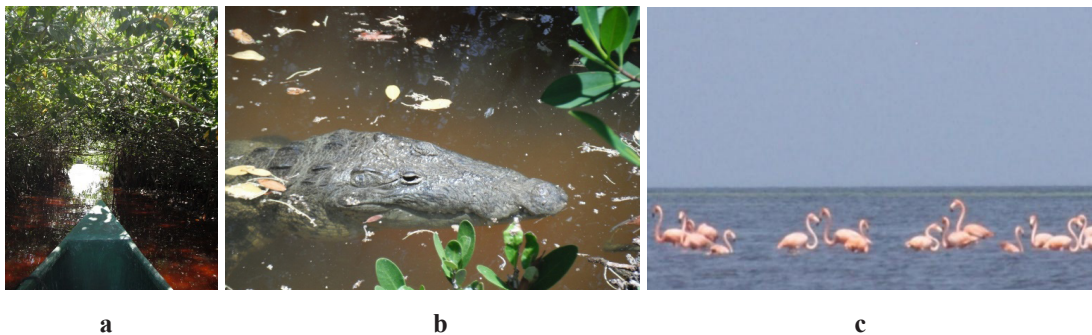


Figure 2. Main ecotourism attributes of the Yucatan coast. Mangrove landscape (left) *C. moreletii* (centre) and *P. ruber* (right).

Source: Own photographs.

3. Methodology

Twenty-five community-based ecotourism ventures (CBET) located in nine localities of the Yucatan coasts were analysed (Figure 2). Inclusion criteria were enterprises belonging to the social sector of the economy, i.e., cooperatives or social solidarity enterprises that provide services throughout the year. As an exclusion criterion, we chose those CBETs that had been operating for less than two years at the time of the study^[22]. We used a mixed methodology, and the research was divided into two parts. In the first, we applied qualitative techniques such as direct observation in the CBETs to obtain information on certain aspects and *in situ* behaviour of the elements to be studied, without disturbing the scenario where they are conducted^[23].

The second part consisted of knowing and quantifying the opinion of ecotourists in the region. For this purpose a questionnaire was designed in both Spanish and English to capture quantitative information among an undetermined population employing standardized questions^[24]. The survey was divided into two sections. The first part asked for data that would allow us to segment the respondents based on sociodemographic attributes (age, schooling, among others) to elaborate a profile of the ecotourist on the Yucatan coast. The second section was composed of nine questions with which each respondent could qualify his or her experience in environmental education. Specifically, questions were asked about biological, ecological and conservation issues. To be representative, a *simple random* sample was chosen^[24]. That is since our study area is the coastal region and our universe are the CBET before each outing the destination was chosen by using random numbers to select the place to be surveyed that day.

Subsequently, a frequency table was made to observe the distribution of the responses, this time we applied a geographic segmentation to divide the population into two groups: nationals and foreigners to compare the perception between the two groups. To construct the frequency table, the number of times an answer was given was counted, in the topics of ecology and biology 2 items were elaborated, so the total number of mentions is 136 ($68 \times 2 = 136$) and the topic of conservation was integrated by 3 items there are 204 possible mentions ($68 \times 3 = 204$).

Finally, a non-parametric statistical analysis was applied to the frequencies obtained to determine if there are significant differences between the two populations, for this purpose an X test was applied (chi-squared) and a numerical value was assigned to each answer: Many 5, Few 3, None 1 and No opinion 0 respectively. In such a way that if an ecotourist answered in the ecological section (2

items) one question with many and the other with few, he/she was given a score of 8 out of a maximum of 10, and so on with all possible combinations.

4. Results and Discussion

Direct observation of the 25 CBETs located in the region was conducted between August and October 2013. During this period, it was documented that all CBETs have environmental education mechanisms in their experiences, which are composed of the direct explanation of the guide and the support material used such as brochures and signs, among others (Figure 3). It was also observed that many of these guides have NOM-09-TUR-2002 certification². On the other hand, most of the CBETs received support and training from academic institutions, international organizations, and NGOs to strengthen environmental education mechanisms and to link ecotourism actively in the care and environmental restoration of certain ecosystems in the region, the mangrove on the Yucatan coasts.

This follows the recommendations of the literature that emphasize that environmental education is the main differentiator of ecotourism concerning other alternative tourism offers while adding that face-to-face communication between guides and ecotourists is the best channel for transmitting environmental knowledge and that this information should be supported by elements such as brochures, signage, and handbook, which complements to deepen environmental knowledge^[6,7,25]. In this sense, it was found that the local guides emphasize more on the experiences and stories of the CBETs and the sustainable actions they have conducted in the region, such as mangrove reforestation, environmental restoration, cleaning of springs and coastal lagoons, recycling, environmental education workshops for school groups in the region, among others.

The questionnaires to ecotourists were applied from September 2013 to February 2014 ($n = 68$), of which 66% were nationals ($n = 45$) and 34% foreigners ($n = 23$). With the information obtained, we realized that the profile of the ecotourist on the coast of Yucatan consists of people with a median age of 36 years old, 32% travel in pairs and 38% travel in groups of friends ≥ 5 members and more than half of the respondents have high schooling (Figure 4). This research supports the findings of the specialized literature, which indicates that an ecotourist is a person between 20 and 45 years of age, who travels in small

² Mexican Official Standard NOM-09-TUR-2002, establishes the elements to which guides specialized in specific activities must adhere [<https://www.gob.mx/cms/uploads/attachment/file/12893/NOM-09-TUR-2002.pdf>].

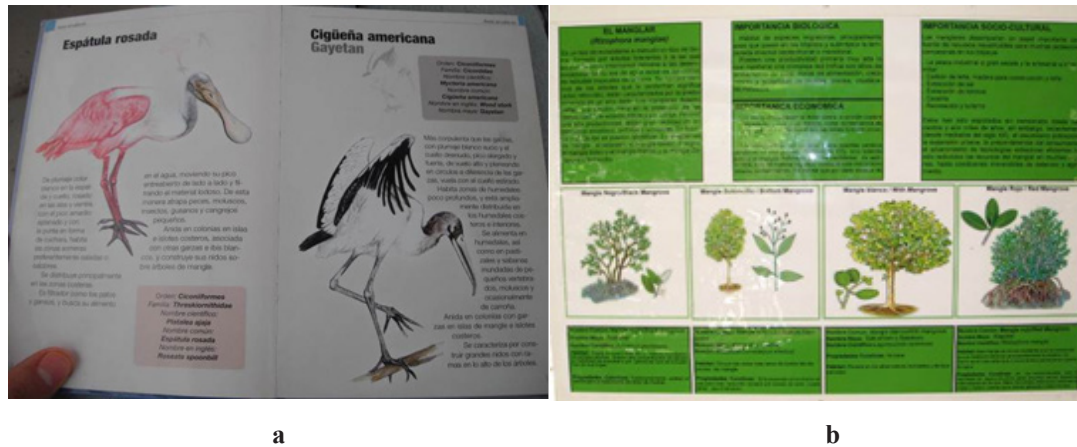


Figure 3. Support material used in the ecotourism offered in the region.

Source: Own photographs.

groups, alone or in pairs in search of experiences with nature from environmental tourism offers, and who has both a schooling and a purchasing power that is in the middle and high levels [5,8,26,27].

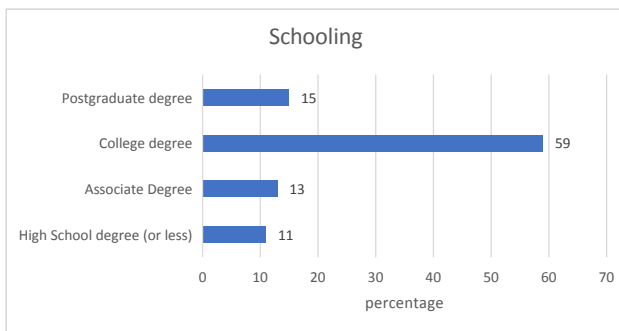


Figure 4. Schooling of ecotourists in the region.

There are few studies on the profile of ecotourists in Mexico; we highlight a national study that showed that 61.8% of ecotourists are nationals and the other 38.2% are foreigners, which reflects a great similarity with the data obtained. On the other hand, when quantifying the economic expenditure, the international market represented 64.2%, since the international market tends to consume the most expensive packages offered at [28]. However, the economic revenue from international ecotourists in Mexico represents only 0.62% of the total income from international tourism in the country in the year 2000 [28].

When we delve deeper into the origin of national ecotourists, we find that less than a third of them are from local (regional)^③ origins, while 72% come from the central and northern states of the country. In other words, the local population is not interested in ecotourism activities in

their regional environment. On the other hand, the international market was made up of visitors from 15 countries, of which the regions with the most visitors were Europe and North America with 74% between them, and on an individual level, the countries with the most tourists were: France (22%), USA (13%), Germany (9%) and Canada (9%) respectively (Table 1). It should be noted that the presence of at least one ecotourist from each continent, except Africa, was recorded.

Table 1. Origin of the international ecotourist

Mainland region	Percentage*
Europe	52
North America	22
Latin America	13
Australia / Asia	13

(*) the percentage was obtained with the total number of international ecotourists (n=23).

All the CBETs stated that their ecotourism offerings were linked to environmental education strategies during the service, 90% (n = 61) of the ecotourists stated that they did acquire some knowledge after their experience and when questioned about how this environmental knowledge was transmitted, 15% (n = 10) stated that no mechanism or means communicated this knowledge to them (Figure 5). We can speculate that their experience is more about environmental interpretation, which is also considered a goal of ecotourism in creating opportunities to obtain knowledge through exploratory and self-guided experiences [25].

This is also related to the difficulty of some ecotourism guides to communicate in a foreign language, the poor signage on certain trails, and the deteriorated condition

③ In this research, the local market is understood as those tourists from Campeche, Quintana Roo or Yucatan, the three states that integrate the peninsula.

of several signs and equipment (Table 2). These were the main responses provided by the respondents when mentioning negative aspects of their experience. Therefore, an area of opportunity for CBET business management is to continue professionalizing the service of the guides (uniforms, foreign language skills) and improve the maintenance of the support infrastructure, such as trails, signage, brochures, among others, since this makes invisible the achievements that CBET has made in environmental matters.

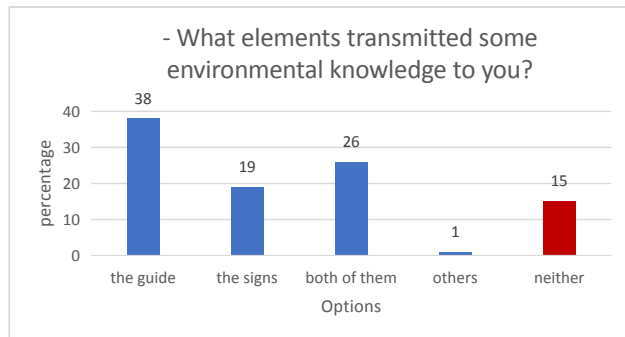


Figure 5. Communication channels in environmental education

Table 2. Frequency distribution

	National ecotourist	International ecotourist	Total	
The guide service	<i>Excellent</i>	28%	23%	26%
	<i>Good</i>	51%	42%	48%
	<i>Fair</i>	11%	22%	14%
	<i>Bad</i>	1%	0%	1%
	<i>No opinion</i>	9%	13%	11%
The signs and brochure	<i>Excellent</i>	24%	23%	24%
	<i>Good</i>	53%	42%	49%
	<i>Fair</i>	18%	26%	21%
	<i>Bad</i>	5%	4%	5%
	<i>No opinion</i>	0%	6%	2%

After asking if their ecotourism experience left them with any environmental knowledge and what was the mechanism by which this learning was achieved, the survey delved into three topics: biological, ecological and conservationist (Table 3). Due to the nature of our data being discrete variables, we used non-parametric statistics and applied X tests2 (chi-squared), to analyse the relationship between the analysed topics and the two surveyed populations. That is national and international ecotourists.

We hypothesized that there would not be a difference between the perception of the national market for the international market. The tests of X² in biological and ecological issues supported our hypothesis since it did not

show a significant difference between both populations, we believe that this is because the coastal landscapes of Yucatan have a good state of conservation and the presence of *flagship fauna* such as crocodiles (*Crocodylus moreletii*), and pink flamingos (*Phoenicopterus ruber*) help to have a good perception in both criteria by the two surveyed populations.

However, when we performed the test statistic on conservation issues, it showed that there was a significant difference between the two populations (Table 3). In this sense, we can theorize that the ecotourist, especially the international one is more critical than the national one, possibly they are people who have already had previous ecotourism experiences, even in other countries and for that reason, they have higher expectations of the service offered by the CBET, also the areas of opportunity exposed in the service of guides and infrastructure would incline the decision of the international market in thinking that ecotourism in the coast of Yucatan does not contribute elements for conservation.

On the other hand, this may be the manifestation of another more complex problem. Since the mid-2000s, Mexico has promoted a public policy that encouraged the creation of CBETs, especially as cooperatives or social enterprises. In other words, CBETs are often created based on substantial amounts of subsidies and loans granted by governmental institutions and international organizations, mainly to access public funding [2,29]. This causes ecotourism to become a replica of the paternalistic system where the goals in social and economic terms are hardly achieved, putting at risk even the benefits achieved in the region in terms of conservation and environmental restoration [2].

Table 3. Frequency distribution II

	National ecotourist	International ecotourist	Total	
environmental issues	<i>Many</i>	42%	48%	44%
	<i>Few</i>	46%	35%	42%
	<i>None</i>	7%	13%	9%
	<i>No opinion</i>	6%	4%	5%
conservation issues	<i>Many</i>	32%	12%	25%
	<i>Few</i>	36%	32%	34%
	<i>None</i>	22%	41%	28%
	<i>No opinion</i>	11%	15%	12%
biological issues	<i>Many</i>	54%	39%	49%
	<i>Few</i>	28%	41%	32%
	<i>None</i>	11%	15%	13%
	<i>No opinion</i>	7%	4%	6%

While in the literature the creation of CBETs is based

on the social empowerment of the host localities^[9], from which environmental education and innovation communities can be created where knowledge and the implementation of pro-environmental actions transcend beyond CBET and become internalized in local societies since the generation of revenue from the conservation of the natural resource translates into greater stewardship and ultimately into sustainability^[5,25].

Table 4. χ^2 (chi-squared) statistic results

	Biological issues	Conservation issues	Environmental issues
χ^2	0.608	5.56	0.0702
p	0.43554	0.01837	0.79119
α	0.05	0.05	0.05
D.F.	1	1	1

Of all the CBETs analysed, we highlight San Crisanto Cooperative, which was formed as a local response to manage its natural resources following the impact of hurricanes Gilberto (1988) and Isidoro (2002), which devastated most of the primary activities of the locality. In this sense, the first formation of restoration and conservation initiatives led to the creation of CBET, this collective action has been recognized internationally for its achievements in the social and environmental field on different occasions with the Arbor Day Award, by The National Arbor Day Foundation (USA) in 2006, Equatorial prize by United Nations Development Programme (UNDP) in 2010 and the Energy Globe Award by the Energy Globe Foundation (Austria) in 2015. This confirms that if CBETs are formed based on local empowerment, the probabilities of generating sustainability scenarios are high.

In this sense, new questions arise, to deepen both the ecotourist economic spillover and whether there is still a significant difference between the national and international market in this aspect. Similarly, more empirical research from case studies on the coast is needed to analyse from a more critical perspective the evolution of ecotourism and its territorial impact. Approaches such as touristification^[30], and political ecology^[9] could contribute new elements to the debate. Likewise, continuing to build more robust ecotourism profiles will allow the creation of typologies that permit the construction of models of the purchase decision-making process, the pattern of motivations, and tourist behaviour^[14].

5. Scope and Limitations

This research allowed us to contribute elements to the debate since the information from this study and those of 2001^[28], being of a regional nature, allow us to formulate

some generalities, since, as Hvenegaard indicates, it is not advisable to extrapolate information from case studies since there are biases a case study represents only a set of ecotourist types not found in other ecotourist destinations^[10]. For this reason, a contribution is that it allows us to generalize, although always with caution, about the composition of ecotourists in Mexico; They are young people, with two-thirds being of national origin and only one-third of international origin. At the same time, both studies show that ecotourism tends to develop in protected areas, so there are some elements to support the proposition that every protected area aspires to be an ecotourism destination^[2].

However, the main limitations of this research are the lack of economic information that would allow us to make deeper comparisons in terms of the national and international market or to have evidence if there are correlations between cost and perception of visitors on the role of CBET in environmental care or the quality of environmental education, in addition, the seasonal nature of tourism, i.e. it has high and low seasons^[10] could lead our measurement to have certain biases because the research was conducted in the summer-fall season so it is expected to conduct more research in other seasons.

Finally, the ecotourist typologies are also constrained by time and space, which is why longitudinal studies are needed to show the behaviour of this dynamic activity since the pandemic crisis of COVID-19 was an example of how volatile and fragile tourism activity can be. Some studies show how the cruise segment has shown a clear recovery, although the pandemic is not completely over^[31]. In this sense, the pandemic has made more eyes turn to natural or cultural heritage destinations, sites that are safer from coronavirus infection due to few and ecotourism directly help local people through the CBET^[3].

6. Conclusions

The ecotourism offers and the demand profile identified on the Yucatan coast meet the standards proposed in the theory of environmental education. However, there are areas of opportunity that could help improve the communication of environmental goals made by the CBETs and prevent such achievements from going unnoticed by ecotourists.

Although the existence of environmental education components indicates that the activity is on the right track, this does not mean that it is a sustainable activity, since in most cases CBETs are not the result of local empowerment, but a strategy to obtain public funding. However, cases such as San Crisanto Cooperative show that it is possible to create the right conditions to generate spaces

for local empowerment and natural resource management.

The geographical segmentation of the ecotourist shows that national visitors constitute two-thirds of the total, while international visitors represent only one-third of the ecotourists, with visitors from Western Europe and North America standing out. We also show that there is a differentiated perception of the pro-environmental actions conducted by the CBETs. Although we are not sure why some hypotheses suggest that the foreign market is more critical of the service provided by CBETs. In addition, the lack of economic and spillover data prevents us from making further conjectures and statistical analyses that would contribute new elements to the debate.

Finally, additional research is needed to examine the multi-dimensional aspects of tourism typologies, using a variety of other statistical analyses (i.e., the correlation) even geostatistics and spatial analysis. In the same way, longitudinal studies are needed too.

Conflict of Interest

The author declares no potential conflicts of interest.

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