# The Sustainability of Planning Tourism for Cuban Beach Ecosystems

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***Abstract—*** *This article addresses elements related to sustainability in tourism-related planning and proposals for how to manage the negative environmental impact in beach ecosystems, which have been caused by certain construction approaches and techniques. For the purposes of this study, said negative impact is defined as the direct or indirect adverse consequences suffered by natural and socioeconomic ecosystems as a result of an environmental change caused by an action or set of actions of human or man-made origin. We will analyze the case studies of interventions in coastal ecosystems with high levels of ecological fragility, such as the beaches of the small islands or keys of Cuba. Strategic lines of action with a focus on sustainability are proposed in order to ensure respectful architectural interventions in these highly environmentally and socio-culturally vulnerable ecosystems of this island region.*

***Keywords— sustainability, planning, tourism, beaches.***

## I. INTRODUCTION

The accelerated development of tourism on small islands or keys is one of the causes of the damage suffered in recent years by the marine ecosystem, in particular the construction of roads and other works. There are evident and undesirable environmental effects, also called negative environmental impacts, which have severely impacted the vegetation, animal habitats, the landscapes, soil and wetlands, as a consequence of construction projects carried out. The large number of quarries opened and exploited, the excessive clearing of vegetation, filling up lakes and other actions that cause serious impacts on the surroundings can be avoided by using design solutions and technologies appropriate to the valuable resources present where the interventions are taking place.

The development plans of Cuban investors call for rapid growth in the beach product in the coming years. This development, and the associated boating and water sports, will take place in coastal and beach areas, primarily in the natural areas of small islands, more commonly known as the Cuban keys, where there are plans to build large-capacity hotel complexes. There are many high quality beaches in this region, but they are also very unstable and highly ecologically fragile and sensitive. Most of the tourism projects being built do not take the environmental dimension into account during the planning and projection stages. This situation is the result of a lack of knowledge of how to build in the keys and other environmentally sensitive and fragile places without causing severe ecological impacts, and the lack of holistic conceptions of projects that could balance the necessary development of tourism infrastructure with sustainability-based approaches and practices (Gutiérrez, 2015).

The development of tourism must be based on sustainable development approaches and the Caribbean is a culturally, socioeconomically and biologically rich and diverse region with complementary tourism projects that are internationally competitive due to the high quality of its beaches (AEC, 2014). In this Caribbean context, tourism is transforming Cuba's economy and represents the most dynamic sector driving construction growth.

The definition of the field of application of the study topic is conditioned by the variety of tourism-related construction activity on different geographic and ecosystemic spaces and the need for an integrated management of environmental impacts, including their ecological, social, economic and technological dimensions, within the principles of a sustainable model of tourism development in Cuba, with the problem to be resolved formulated as the following question:

- What are the necessary definitions, existing insufficiencies and most important actions that must be considered in an Environmental Impact Assessment of tourism construction in beaches and other Cuban coastal areas in order to introduce sustainable development approaches?

Many coastal areas of Greece, Spain and the entire Mediterranean have suffered a decline in tourism due to the gradual destruction that this massive industry has wrought, despoiling the natural resources on which the entire industry

is based with an excess of visitors to the beaches and especially the manner in which hotels were built on them.

An analysis of tourism on the islands reveals it is the second most important vacation destination, surpassed only by historic cities. Ecotourism in Dominique and Seychelles, scuba-diving in Malta and the Maldives, music tourism in Cape Verde, cultural tourism on the Marshall Islands, festival tourism on the Bahamas, meetings and conventions in Trinidad and Tobago, and medical tourism in Barbados, are just some of the strategies being employed by small insular states (Roberts, Lewis-Cameron 2010).

The positioning of Cancun as a classic sand and sun destination, together with the development of tourism infrastructure that has reached Cozumel, Islas Mujeres and Playa del Carmen, began to gain notable influence and in the decade of the 1990s the "Cancun-Tulum Tourism Corredor" emerged, the central part of which has in turn been rebaptized as the "Mayan Riviera". Currently, the Cancun-Tulum Corredor has become the foundation of the accelerated economic and social growth of the entire state of Quintana Roo, and it is a key zone within the development of tourism in Mexico (Perez, 2015). Here, the physical occupation of the coast (with its more than 11,000 kilometers of coastline) has resulted in mass and uncontrolled urbanization (the coasts are home to nearly a third of the country's population) along the coastal strip, in addition to the alarming proliferation of hotels and port facilities, which have redrawn the coastlines and irreversibly altered their natural dynamics (Greenpeace, 2013).

The massive model of sun and beach tourism imposed by the operators and the market speculation which has destroyed the beaches in Spain and other European countries, has been repeating itself in Acapulco, Cancun and other Caribbean islands. The negative experiences of other countries need to be studied, especially to avoid architectural models that damage nature and are oblivious to national culture, and to be able to introduce sustainability into tourism construction.

The explosion of Cancun as a tourism destination began in the eighties, with a population that multiplied in just a few years, arriving primarily from the Yucatan Peninsula; as well as the rest of the country and other places in Latin America and Europe. The tourist part of Cancun is called the "Zona Hotelera", a strip of white sand that runs all along this municipality of Benito Juarez, full of beach hotels which are the city's main attractions (*Impactos del Turismo* Blog, 2013).

An excellent example of the depravation of coastal tourism is the tourism development that characterizes the Mexican Caribbean, which encompasses most of the state of Quintana Roo, from Cabo Catoche in the north to Xcalak in the south, and which has stood out in recent years as a tourism destination par excellence (95% of the state's GDP) (Campos, 2011).

In recent decades, and since the international spread of the paradigm of pursuing sustainability in development, which has become a common part of all political, social and economic discourse, it appears that there is no doubt about the need to integrate environmental aspects into the analysis of any short, medium or long-term development strategy.

Since 1992, the Wuppertal Institute, and Weizsacker and Lovins since 1997, have been promoting the so-called Factor 10 and Factor 4 to double welfare with half of the natural resources, through efficiency and enhanced quality of life, using very efficient technological solutions and measures and a new non-consumerist way of life. It is important to analyze the technological aspects, which have their limitations and particularities, within the current conditions of the sustainable development model in Cuba, given that it is a dialectic process in constant evolution. This includes the need to use natural resources below their replacement rates, analyze the use of the physical space or territory depending on its carrying capacity and to incorporate into the surroundings in return a flow of materials and energy that is within its capacity to assimilate them (O'Reilly, Bancroft, Ruiz, 2010).

The preceding lines fall within the current of ecological economics which has emerged out of the evidence generated by the scarcity and depletion of natural and energy resources, and the growing pollution and climate change, and which criticizes the outlook of traditional economic sciences with a focus on resource and energy consumption.

## II. MATERIAL AND METHODS

The application of environmental assessment methods to the field of architectural and construction design allows us to study and evaluate the actions that take place in the activity of planning, projecting, implementation, the use and eventual abandonment or recycling of built objects, with the goal of determining, predicting, interpreting and communicating the negative impacts that these actions cause to the environment under current conditions, in order to achieve a social model with sustainable approaches to tourism.

In order to achieve this goal, instruments are needed that can lead toward sustainability, that guide people's actions and that enable integration in the northern keys and other coastal tourism poles. One of these instruments is the environmental impact assessment of development plans, programs and projects, which is directly related to other instruments in the environmental management system for sustainable development in Cuba. Environmental impact assessments, and above all strategic environmental assessments of development plans and programs, help to optimize planning and decision-making to avoid causing irreversible damage to the environment.

At the same time, it is necessary to use the analysis and synthesis method to study the primary contributions of the research subject and to verify its validity in the field of tourism construction. This method is also present when taking into account that the research subject is located within a different economic, political, social and bio-geographical context than those addressed by other works in the international and national literature The method employed allows us to confront the human contradictions that lead to the need for rapid economic development in adverse conditions of survival and economic embargo in order to improve the quality of life of the society, exploiting natural resources (cause). It also considers the dilemma that this exploitation leads to environmental degradation and the unrecoverable loss of its biodiversity (effect), the receiver of which are people and their descendants.

The systemic-structural model is used based on the belief that the study of environmental impacts includes all dimensions of sustainable development, based on a systematic and holistic approach. The study also employs empirical methods involving consultations and meetings with experts which revealed that the analysis of the environmental impact studies goes beyond the frameworks of the multi-disciplinary and is transformed into transdisciplinary knowledge.

## III. RESULTS AND DISCUSSION

The instruments which lead to sustainable development, which can also be referred to as procedures to influence, modify and order economic, social and environmental processes, are quite varies. They are adjusted to the pathways for achieving sustainability according to the paradigms of each country. Those that are most commonly employed and recommended currently are the following: policies and strategies; management procedures, plans, programs and projects; governmental and non-governmental institutions; territorial planning; legislation and regulations; education, information and dissemination; grants and subsidies; scientific-technical research and technological transfer; environmental impact assessments; inspections and audits; the actions of civil society and public participation and the system of integrated economic leadership (Ruiz, 2000).

Through the integrated use of these instruments, and with a systemic and holistic approach, it is possible to introduce elements of sustainability into an economic sector, activity or project in development such as architectural planning for tourism. Table 1 is a summary of the main aspects.

There are many means to environmental protection defined by policies and strategies, and some of the most commonly employed are environmental management instruments, primarily used to mitigate the environmental impact of activities and projects on natural ecosystems and respect for the acceptable limits of change.

The means to achieve economic efficiency include energy efficiency, rationality in the use of appropriate materials and technologies, waste management and economic and environmental costs, among others. Improving the quality of life as a way to achieve sustainability takes into account the well-being of the population, income, employment, education, health, equality and recreation. Also relevant are citizen participation, and respect for communities' way of life of and cultural traditions.

### 3.1. Environmental Planning and Architectural Projection for Tourism

Environmental planning, as a planning process and an instrument of environmental management, is expressed in a model that includes the zoning of the area into environmental units, environmental guidelines (defined as the goal or desirable state for each zone and its natural resources) and environmental strategies that should be included in land use planning (Martinez, et al; 2012).

In the discipline of architecture, especially in the planning stage, environmental aspects should be considered based on other instruments, such as:

- Land use plans and projections based on eco-design or green and sustainable architecture
- Economic and environmental costs
- Research and technology transfer
- Public participation
- Preservation of the tangible and intangible cultural heritage

The task of making projections enters late into the environmental impact assessment process, and many times during the executive projects stage there is a divorce between

the architectural and urban design and the landscape characteristics of the surroundings. There is a trend in the field of tourism, for example, to prepare uniform hotel projects that are similar in size and design; hotel layouts from urban areas are reproduced in natural areas and the hotel architecture tends to be standardized (at an average size of 300 rooms), consisting often of one block, glass-encased on any façade, for public functions and services and another area with lodgings and cabins spread out within the parcel with little formal unity between them (Ruiz, 2016).

These tendencies, following the example given, mean that all of the tourism destinations look very similar and lose any identity that could distinguish one from the other as a tourism product, because the architecture is the image of that product that is going to be sold in a more and more competitive market. In order to respect nature and adequately interpret the design responses, one must study the natural values of the sites being planned and project how the environment will behave in response to the modifications being made.

By looking more closely at the aspects of the environmental impact evaluation and its relationship to the sustainable development of tourism construction, this work:

- Facilitates and specifies the actions to carry out to contribute to the development of sustainable tourism construction projects.
- Contributes to providing direction and adopting better decisions with respect to the environmental impact assessment of tourism construction and other instruments that can lead to sustainable development.
- Attempts to be able to detect and eliminate errors and omissions in existing and future documents related to environmental protection and sustainable development in this field.
- Contributes to perfecting the methodological system and the institutional and legal structures involved in the concepts and tasks related to environmental regulatory activity.
- Allows for greater effectiveness in the conception of tourism construction, considering the environmental impacts within the preliminary analysis and decision-making processes related to planning, analysis of alternatives, selection of modes, physical planning and design.

### 3.2. Economic and Environmental Costs of the Interventions

The Cuban investment planning process includes the economic costs and the cost of feasibility studies, but does not include the long-term costs where one must consider environmental costs (cost-benefit analysis), so that they can also be included in the information provided to decision-makers, especially for investments deemed to be of national importance.

Although progress has been made in refining the economic feasibility studies for investments in general, there is still a long way to go in terms of valuing environmental costs. For Cuba, it is necessary to come up with new methods to account for natural resources, and to implement a tax and lien system to use to create environmental protection funds. There is a need to begin to economically value the prevention and mitigation measures proposed as a result of the environmental impact assessment.

### 3.3. Investigation and Technology Transfer in Construction Projects

There are insufficiencies in the technological responses that are needed in the construction sector in order to respond to the call for sustainable tourism development. In Cuba, there is extensive scientific and technical potential to cover the demands for studies and research in the field of the environment and sustainable technologies and development. Nevertheless, in a review of the topics that appear in national scientific programs there appear to be few studies that manage to address this issue, as well as an insufficient incorporation in practice of the results of scientific research to provide integrated and viable solutions to technological problems that could respond to environmental needs, primarily clean and appropriate technologies.

It is essential to strengthen scientific programs and projects, technological innovations, and their linkages with the development of prioritized sectors, especially the tourism sector which depends to a large extent on the conservation of natural resources.

The evaluation of the transfer of technology is necessary for comprehensive analysis, feasibility studies, project designs and assessments of the environmental, cultural and technological impact.

### 3.4. Public participation in Design

Public participation does not take place in all studies directly with the population affected by a project, although conceptually given the conditions of the Cuban social model, it would be viable to operationalize it since there are community structures in place to facilitate the process.

### 3.5. Preservation of Tangible and Intangible Cultural Heritage

It is noteworthy that in many recently built tourist complexes, the architectural design is not consistent with the historical legacy, climate and identity of the Caribbean, primarily in relation to the climate, visual and morphological impacts on the surroundings.

The incongruence of the architectural design is manifested because there is no relationship with the natural and socio-cultural environment, and there is a tendency to incorporate market-driven designs which do not take identify preservation into account, and for the most part are not adapted to the climatic conditions of the humid tropics and the characteristics of the natural landscape.

## IV. CONCLUSIONS

From the analysis and evaluation carried out in this study, some conclusions can be drawn on how to improve the environmental aspect of planning tourism-related construction projects in beach ecosystems, and recommendations are proposed for strategic lines, legislation, education programs, research, oversight, environmental economics and other tools to encourage, promote and direct sustainable processes in this area over time.

The work discusses the current status of tourism-related architecture on beachfronts and other coastal areas, including economic, socio-cultural, environmental aspects and other instruments aimed at ensuring sustainability.

The application of the work will contribute to the analysis of economic costs from an environmental perspective, through the adoption of preventive environmental measures rather than retroactive ones; reducing the consumption of materials, manpower, energy and time by focusing on the problem in advance and estimating the environmental costs that must be included in long-term valuations as part of feasibility studies.

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