

## Economic Analysis of the Tourism and Its Impacts in the Ecosystems Services for the Coastal Area in Baja California Sur

*José Isabel Urciaga Garcia, Judith Juarez Mancilla, Placido Cruz Chavez, Claudia Lorena Lauterio Martinez*  
(Universidad Autónoma de Baja California Sur, La Paz, BCS 23080, Mexico)

**Abstract:** Changes in land use from coastal areas affects the ability of natural resources to provide ecosystem services, disturbing the sustainability of the global system. Marine and coastal ecosystems as major providers of services are especially sensitive to the direct and indirect promoters of global change, habitat modification, and introduction of invasive species, over-exploitation and climate change. Management of coastal areas has been a challenge due to the complexity of the ecosystems; difficulties are exacerbated by business growth, urban and tourism in coastline. The expansion of human settlements as a result of housing development and tourism megaprojects has produced significant changes in environmental services and requires priority attention to mitigate anthropogenic effects. This study is a first approach to characterization of interaction between tourism, coastal and marine ecosystems and their value in Baja California Sur.

**Key words:** land use; ecosystem services; tourism; Baja California sur

**JEL codes:** L80, L83, Q57, R14, R52, Y91

### 1. Introduction

The tourism sector is the one with the largest impact on economic growth in Baja California Sur (B.C.S.). The foregoing causes deep changes in the use of the services that provide the coastal and marine ecosystems in the region. The changes are generated as a consequence of the development of resorts for the tourism, the urbanization that modify the use of the soil, the landscape and ecosystem services.

The coastal zone represents a formidable challenge to its domestic economic and sustainable management; difficulties were exacerbated by the growth of trading, urban and tourist of the coastal line. This disordered growth of human settlements in fragile and vulnerable environments cause far-reaching changes and many times irreversible not to consider the public policy measurements as well to correct and articulate properly the regional economic development with conservation of natural resources.

Foreign direct investment is the base of growth in the tourism sector, with more than 1.120 companies that are actively involved in the markets of Baja California Sur, especially in the labor markets, real estate and

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José Isabel Urciaga Garcia, Ph.D. in Economy, Universidad Autonoma de Baja California Sur; research areas: economy of the natural resources, economy of the ecosystem services, development and environment. E-mail: [jurciaga@uabcs.mx](mailto:jurciaga@uabcs.mx).

Judith Juarez Mancilla, Ph.D. in Economy, Universidad Autonoma de Baja California Sur; research areas: sustainable development, tourism. E-mail: [juarez@uabcs.mx](mailto:juarez@uabcs.mx).

Placido Cruz Chavez, Master of Science, Universidad Autonoma de Baja California Sur; research areas: sustainable development, tourism. E-mail: [juarez@uabcs.mx](mailto:juarez@uabcs.mx).

Claudia Lorena Lauterio Martinez, Master of Science, Universidad Autonoma de Baja California Sur; research areas: ecosystem services, tourism, natural resources management. E-mail: [lorena\\_lamarty@hotmail.com](mailto:lorena_lamarty@hotmail.com).

collateral services (hotels, travel and other recreational services, financial, insurance and rental), what is reflected in a dynamic sector of real state associated with tourism. The foregoing has important socio-economic and environmental impacts in the coastal area by the change of land use. Among them is the question of property rights (Urciaga, 2012).

## **2. Literature Review**

Ecosystem services consist on the social benefits afforded by natural resources (Kline, 2007). Represent the direct and indirect benefits to the human population derived from the functioning of ecosystems (Costanza et al., 1997). Many of the ecosystem services have features of public goods and global or local markets have not been structured to establish mechanisms for efficient allocation in function of the price system. Many cases even have been quantified in terms comparable to other private property of direct use and have very reserved importance in the plan of conservation policy.

Daily (1997) clearly defined those services that are derived from the functions and processes of ecosystems that have relevance from the ecological perspective, in contrast to the lack of precision of the support services for the cultural and intellectual development. A very widespread classification is used by the report of the Millennium Ecosystem Assessment (MEA, 2005), A study that uses four large groups of ecosystem services: base, provisioning, regulatory, and cultural.

The ecosystem services result from complex interactions between the natural environment and the socio-economic status, which operates at spatial and temporal scales. Many of these services are for direct consumption, have property rights and market prices. Beach tourism for example involves a clearly developed. In contrast there are other services in the markets that are not yet built and their economic values and prices can be estimated using various procedures (Perrings, 2006; Heal et al., 2005). Regulating services are further difficulties in their measurement and valuation. These services can alter the supply of cultural services.

Ecosystem services that regulate natural disasters emphasize their importance of protecting, for example mangroves and coral reefs that protect and reduce the vulnerability of the damage. There are also other services such as the cultural ecosystem in which the social welfare can be derived from the natural world, includes some services that are based on the values of passive and non-use of ecological services in that property rights and markets are undefined and are governed by alternative mechanisms to the market as the informal rules that establish communities as usages and customs.

The scientific challenge is to understand the connection between biodiversity, ecosystem function, and the provision of ecosystem services, and analyze the requirement of add a total economic value on the entire natural capital (Hooper et al., 2005; Spehn et al., 2005). Many studies have concentrated on studying the significance of the services of terrestrial ecosystems, to quantify the size of their changes and their impacts on social welfare or marine ecosystems (Daily et al., 1997).

## **3. Methodology**

To scan the area of study at the state level, The Peninsula of B.C.S was used the topographic 1:50000 as base map, through the digitization of the contour (O'Neill et al., 1996). To this base map was added the layer of the Series III, land use and vegetation type of National Institute of Statistics and Geography (INEGI) 2002. We used satellite images; to ensure that the units that obtained in the layer of the Series III corresponded to which they

could display on the satellite image.

There was a documentary verification according to the information obtained from government institutions such as: National Forestry Commission (CONAFOR), National Institute of Ecology (INE), INEGI, the National Commission for the Knowledge and Use of Biodiversity (CONABIO), to monitor that reported units in series III corresponded to the type of vegetation and type of land use current and projected for the area. It is based on the classification, in ecosystem, training and type of vegetation and land use generated by CONAFOR and UMAFOR 303. Used data from the Government of Baja California Sur, called Urban Development Plan (PDU), with the intention to know how the Government will make the development of the coastal zone and which areas are projected to use, and assume development.

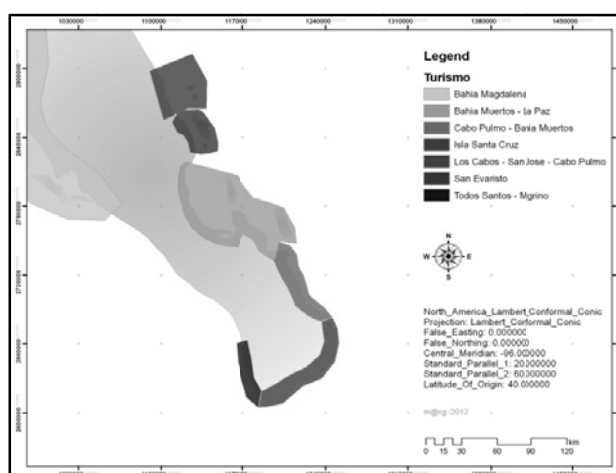
Finally the maps where obtained, this images describes the types of vegetation and land use, topography, soil, hydrological, watersheds, among others. On the basis of these thematic maps were made several crosses of layers for obtaining surfaces processed areas.

For data collection was carried out a survey, as well as feedback about the quality of the service, and the decision to return to this tourist destination (B.C.S). Averages were obtained ( $\pm$ Standar Deviation) for the cost of the service of diving, the annual income of visitors, in order to see if there were differences in the income and in the costs paid depending on the nationality, all the information was analyzed in the program Evviews.

For the region of El Sargento and La Ventana, geographic information systems (ILWIS and ArcMap 9.2) were used for the recognition of cadastral maps, aerial images from three different periods (Chuvienco, 1990). For the information of soil valuation and prices, a special investigation was conducted with experts belonging to the real estate sector; the official values of the soil were obtained in the municipal cadastre.

## 4. Results

Tourism attracts to Baja California Sur (B.C.S.) more than two million visitors per year, with a majority of foreign tourists, hotel occupancy records an average close to 60%, with a seasonal component in the winter period and during the sport fishing tournaments, the hotels are located in 290 facilities with 15.384 rooms of all categories and 9 marinas that provide shelter to the nautical tourism. The pours economic behaves around 60 billion pesos.



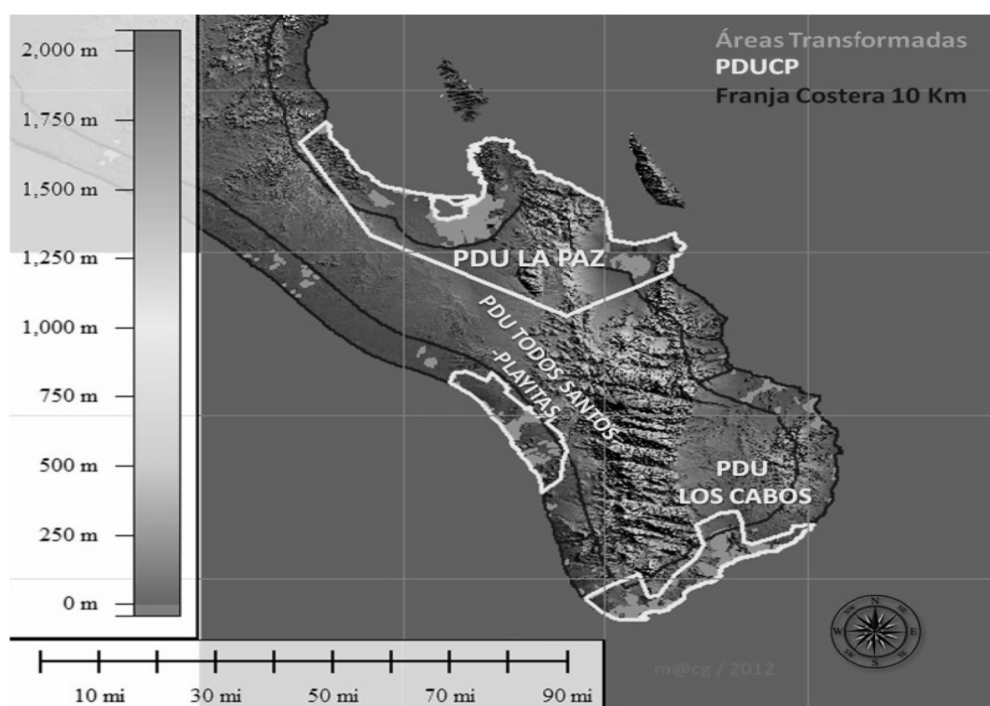
**Figure 1 Main Tourist Areas in B.C.S**

Source: Maria de Los Angeles Covarrubias, 2012.

Areas with the highest tourist importance in B. C. S. were identified (Figure 1). Los Cabos, San Jose del Cabo, La Paz and Todos. Areas where ecosystem services provided by nature allow the provision of resources with great economic value, representing a unique ecosystem on the arid zones of Mexico.

Ecosystem services of greater relevance identified in B. C. S. are: (1) refuge for species; (2) scenic beauty; (3) food production; (4) recreation; (5) cultural; and (6) genetic resources. Each linked to ecological functions and to specific users.

The tourist activity, which is based on the use and exploitation of coastal and marine ecosystems, generate significant income for the State, however the impact of this activity has irreversible effects in the coastal system, causing the transformation of key areas for the appropriate operation of ecosystems (Figure 2).

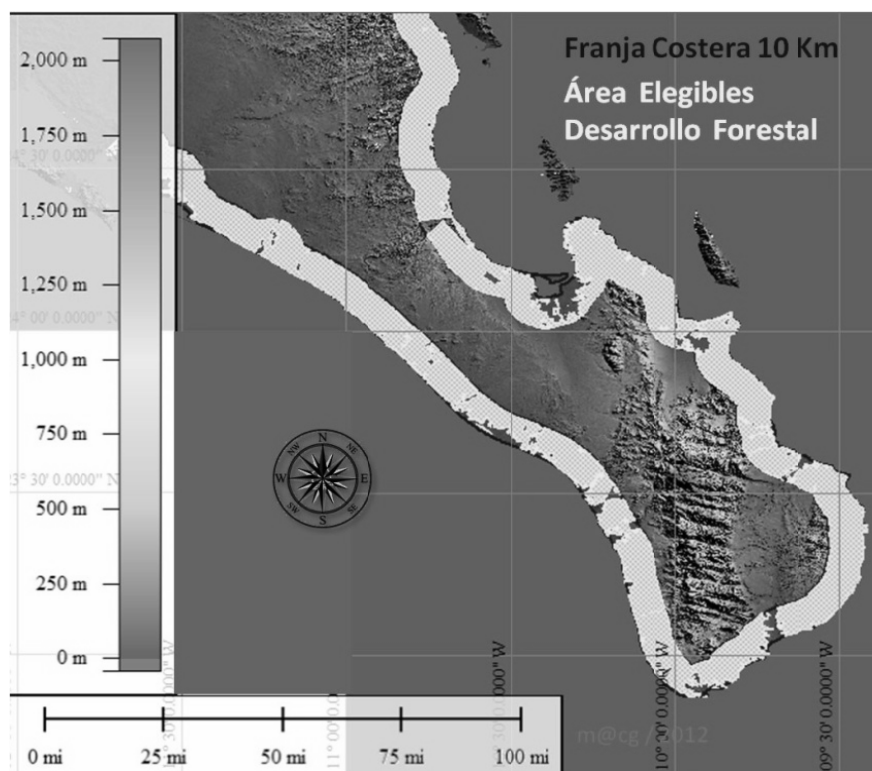


**Figure 2 Areas Impacted by Tourism in the State of BCS**

Source: Maria de Los Angeles Covarrubias, 2012.

The coastline of the state was identified with the greatest potential for growth of tourism, with the purpose to obtain eligible areas for conservation and selected areas for development (Figure 3), nevertheless the growing demand on the market of real estate exercised by the potential clientele (retired, tourism developers, hotels, houses for a second home) installed temporarily or permanently in the coastal zone change this purpose, causing strong pressure in coastal and marine ecosystems.

It is estimated that for the coastal strip from the municipality of La Paz, has referred to a surface of 464.728 hectares which represents the 78% and for the municipality of Los Cabos provide a surface of 134.304 hectares representing 22%, respectively, in total it is estimated that for the two municipalities has covered an area of 599.031 hectares (Table 1).



**Figure 3 Eligible Areas for Development**

Source: María de Los Ángeles Covarrubias, 2012.

This partially explains the rapid growth of the real estate market and the increase of tourist settlements, impacting and causing changes in services that provide the marine and coastal ecosystems.

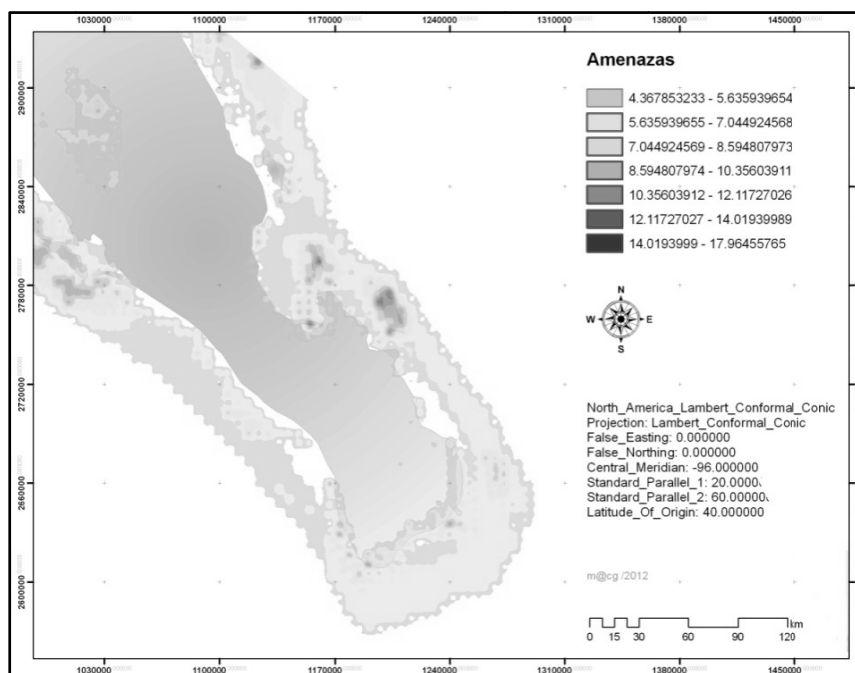
**Table 1 Forest Development Areas Eligible for BCS in 2012**

NOM_MPIO	Area		HA.	%
La Paz	23,790.126	2.38	464,728	78
	8,852,091.586	885.21		
	2,221,601,368.868	222,160.14		
	2,416,799,177.487	241,679.92		
Los Cabos	1,343,026,922.208	134,302.69	134,304	22
	6,794.362	0.68		
	2,836.017	0.28		
Total		599,031.30	599031	100

Source: María de los Ángeles Covarrubias, 2012.

The expansion and speculation in the tourism market, infrastructure and equipment with a negative impact to the state of B.C.S, because the use of the resources is not sustainable and the ecosystem services provided by the region are impacted. The sector of tourism causes an increase in the demand for goods and services by marine ecosystem, creating threats to the habitats of the main species.

Among the activities that generate the main threats are over-exploitation of fishery resources, since the lack of programs to guide management and sustainable use of the resources has caused pressure in the species present in the ocean near to the coastline (Figure 4). Affecting the life cycle of endemic and main spices and thus the service provided.



**Figure 4 Marine Area with Major Index of Threat**

Source: María de Los Ángeles Covarrubias, 2012.

#### **4.1 Ecosystem Services and Their Economic Value in Archipelago of Espiritu Santo, B. C. S, Mexico: Recreational Diving in Case Study**

Within the Bay of La Paz, is located the complex of the archipelago of Espiritu Santo, represented by various portions formed by island, being the largest island, where the tourist recognize some dive zones, as: El Bajo, Los Islotes (La Lobera), El Bajito, Isla Ballena, Roca Swanee, Punta Lobos, La Reina (Isla Cerralvo), La Reinita (Isla Cerralvo), Isla Las Ánimas, Pecio Salvatierra (El Ferry), Fang Ming, Cañonero C-54 Francisco Márquez y Las Lapas.

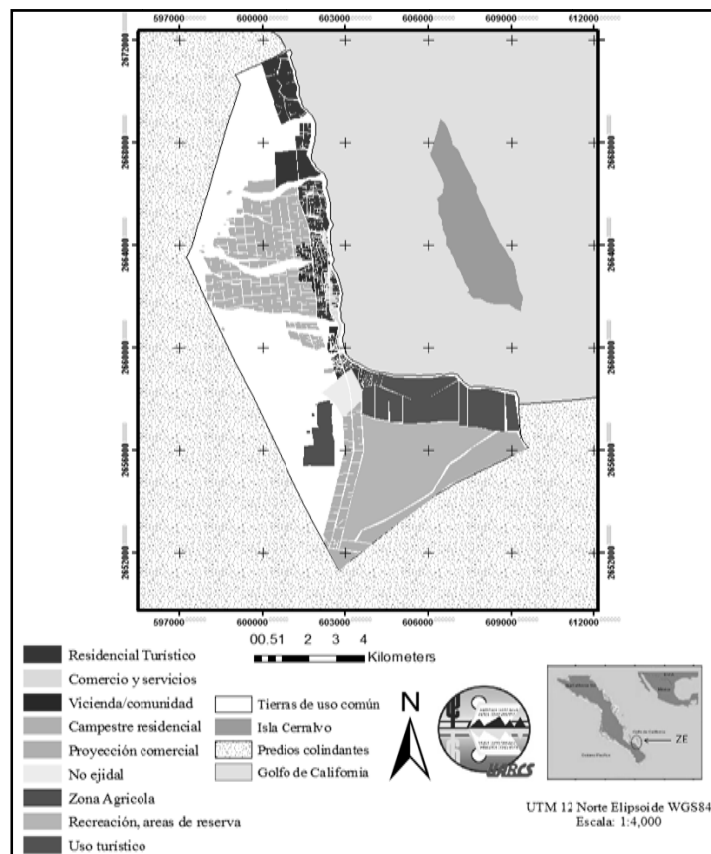
The total cost that tourists paid in this area by the diving services behaved in an average of \$2.440 (two thousand four hundred forty pesos 00/100) ( $\pm \$3057.44$ ), the minimal cost was \$1.500 Visitors who paid between \$1.500 and \$2.000 (one thousand five hundred to two thousand pesos 00/100M. N) by the diving services was 40%, 22% paid between \$2.001 and \$3.000 (two thousand one and three thousand pesos 00/100) And the rest were paid between \$3.001 to \$11.000 (three thousand one and eleven thousand pesos 00/100) for the service.

Depending on the nationality the average cost that tourists paid by the diving services differ, for example European tourists were those that paid more by the diving services at a cost of \$9.316 (nine thousand three hundred ten and six pesos 00/100M. N.;  $\pm \$1.996$ ), followed by the tourists of other nationalities who paid \$5.724 M. N. (five thousand seven hundred twenty pesos 00/100M. N.;  $\pm \$1.600$ ), the Mexican, U.S. and Canadian tourist paid between \$2.000 (two thousand pesos 00/100M. N.) and \$2.700 (two thousand seven hundred pesos 00/100) by the diving services.

#### **4.2 Land Use in El Sargento and La Ventana, B. C. S.**

It is possible to identify in the analysis the different uses of growth already projected that demand for the real estate market and the trade of parcels that develops goes hand in hand with, the services of the ecosystem that allows the implementation of tourism and recreation, generates a projection of market-based on the recognition of tourism as economic tool for development (Figure 5).

The priority sections for expansion are: residential tourism, commercial projection, tourist use, rural tourism, recreation and green areas, representing an occupy of 55.5% of the total of the area (ejido El Sargento and La Ventana). A 39% of the land in common use, which do not have up to the time of the analysis a given projection and the 5.5% of the land distributed among housing/community, commerce/services and agricultural use.



**Figure 5 Growth Expectations in El Sargento y La Ventana**

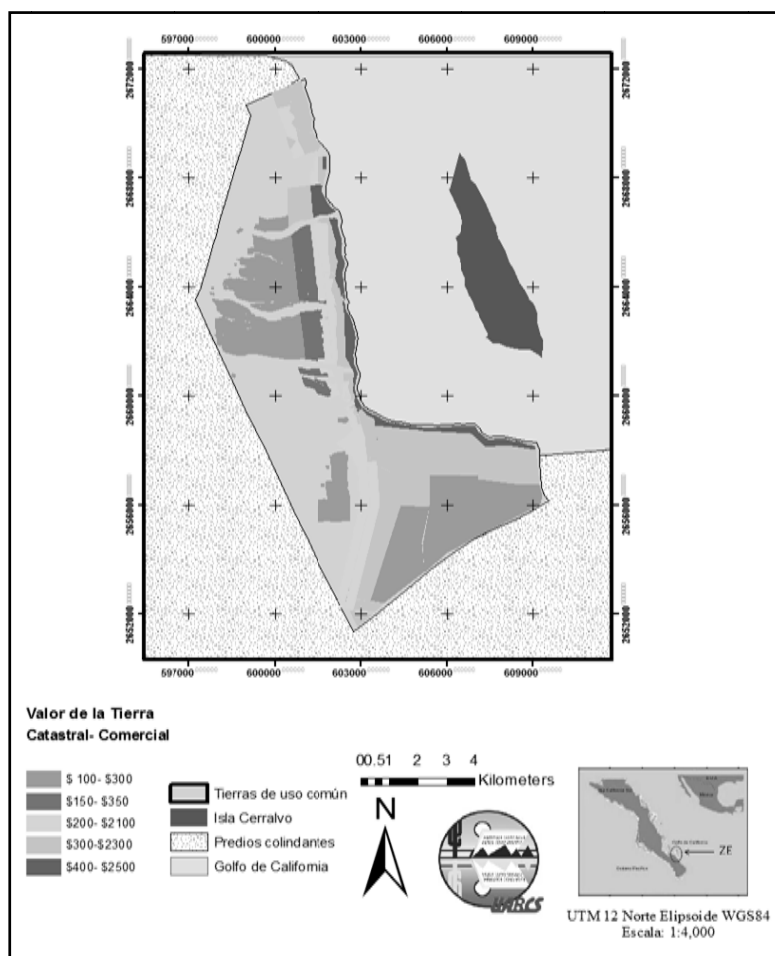
Source: María de Los Ángeles Covarrubias, 2012.

#### 4.3 Economic Value of the Soil in the El Sargento y La Ventana, B.C.S.

The commercial value for this analysis is the most important, because it identifies which zones in the region of study has the greatest interest for the tourist market, represented by those zones with beach access.

Getting that 80% of these zones whose main destination is for tourist use (residential and hotel) 35% is estimated at a price of \$2.500 pesos per sqm, considering its closeness to the sea, the access to the basic services and urbanization. As soon as those zones oriented services sector and commercial which represent a 25%, are estimated at a value of \$2.300 pesos per sqm, a value that is based on the development and growth in the services sector (restaurants, shops, shops) for the region.

The rest of the rural properties, represented by the 40% is oriented to the residential use without beachfront and absence of services valued in a range of \$2000.00 to \$100.00 pesos sqm. However, the absence of regulation in the real estate lacks an assessment prior to certifying the actual price, including the value of the variables environmental and social. The behavior of the ejidatarios is recognized also, because they do not include the mentioned variables to consider these prices, exchanging zones by other types of goods, thus causing changes in the management and transfer of the rural properties.



**Figure 6 Economic Value for Rural Properties in El Sargento and La Ventana**  
Source: María de los Ángeles Covarrubias, 2012.

## 5. Conclusion

In Mexico and particularly in Baja California Sur, mass tourism is linked in a way of a network to its important locations preferred by foreign tourists.

Among the activities that generate the main threats are the overexploitation of natural resources, environmental degradation and lack of plans to guide the use, management and sustainable use of ecosystem services. It is frequent that the ecosystem services and the coastal landscapes change as a result of establishing infrastructure for tourist and human settlements in beaches, dunes, estuaries and coastal lagoons. For this reason, the intensive use of the coastal and marine ecosystems by tourism cannot be exploited without given the evident control for avoid the level of degradation of ecosystem services. The future development of the tourism activity is conditional on the implementation of sustainable development criteria and especially the application of economic plans with instruments of urban development and ecological management of marine and terrestrial.

Take responsibly tourism demand current which gives a significant natural and cultural heritage implies not degrade ecosystem services. This perspective incorporates new areas of opportunity to develop the company dedicated to the nature tourism, complementary opportunities that can improve social cohesion. There are many activities of responsible tourism as the observation of ecosystems, whales, turtles, birds, and geological



observation of fossils, among others, activities to minimize impacts on the environment once that establishes your orderly use and follow the indications provided by the respective management programs.

### 5.1 Archipelago of Espiritu Santo

Is one of the main tourist attractions of the La Paz Bay, this island being visited for a multitude of activities as mentioned in the background and in this way should be focused efforts to integrate the information social studies such as this with biological studies which are already being carried out in consistently in the islands.

This island brings resources to an important part of the tourist companies of diving in the bay in the high season months that are the months of June to September in where the weather conditions allow the activity of recreational diving, however, other activities such as kayaking and fishing are of relevant importance in other times of the year; it was the same with the activities of hiking and camping can be done the other months of the year in which there is no other activities due to weather conditions.

### 5.2 El Sargento y La Ventana

El Sargento y La Ventana shows that the real estate development is the most dynamic sector in the region. The construction of homes of speculative type “spec house” are inhabited during the winter season and will lead to problems with regard to the use and property rights, as well as in the legal field, affecting the status of land ownership which generates negative effects in the social sector, by the intervention of the local organization (control ejidal) and the legal figure of property to foreigners.

This phenomenon has promoted the growth of tourism since 1993 until now, as a result of the amendment to article 27 of the Constitution in 1992, for the first time was granted the full dominion for the rural properties in the common use land. The result of this reform for El Sargento y La Ventana particularly, has been interesting and continues increasing the use of land for tourism purposes, mainly motivated because of the growing real estate market.

As a result of the process to incorporate “el ejido” (common land), there is a gray area because of the lack of participation by the public and government institutions in urban development, thereby gaining the predominance of the free market for the soil in which the municipal governments are facilitators.

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