THE SOFT SYSTEM METHODOLOGY TO BUILD A SUSTAINABLE SPACE OF A TOURIST CORRIDOR FROM PUERTO ANGEL BAY TO MAZUNTE BEACH, IN MEXICO

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ABSTRACT

This research paper shows how a spatial array was built through the integration of a part of the Soft Systems Methodology of Peter Checkland to obtain a supported diagnostic. The study is applied to a tourist corridor case in Mexico. The development of this array is based on the locational theory of space. Moreover to elaborate a matrix of environmental impact a harvesting of samples was done. The array is designed considering the main concepts of the sustainable development as the conservation, preservation zones, the measures of muffling and alleviating, in order to achieve the appropriated life promotion, dynamical equilibrium, harmonic convergence, integral ethics, intuitive rationality, and planetary consciousness with the management of natural resources and its preservation for the future generations. After building the array its instrumentation is proposed through the management of its application to the proposed corridor with the supporting of federal, state and municipal governments in which it is located.

Keywords: Soft Systems Methodology, Locational Theory, Sustainable Development, Muffling and Alleviating.

INTRODUCTION

The research paper is an applied real study directly in the corridor by a researcher of the Industries Institute of the Sea University, in Oaxaca, Mexico, and it pretends to explain the construction of a sustainable space array (World Bank, 2010) through the Checkland's Soft System Methodology (SSM) (Checkland and Scholes, 1990) in the quest of inventive solutions in the selected zone in Mexico. However we believe that with this methodology we will achieve the final objective established as a goal. In addition we hope to achieve this goal using another in parallel called Accidentations' Methodology by Sabol, Bufford and Crawford (2000) which allows identifying the main truncations, fragmentations and parabolic effects in order to calculate the impact area for this array proposal. Moreover, the main measures of muffling and alleviating to conserve the environment along the corridor will be detected.

Initially, the Soft System Methodology (Checkland, 1981) is adapted to the studied case using only the non-structured problem situation, the rich picture, the roof definition and the improving actions (steps 1, 2, 3, and 7 of the SSM) to describe the environment. Afterwards it is shown how the Matrix of Environmental Impact (Leopold, 1971) is presented. Notwithstanding it is not deeper due to the work for building this matrix, long in nature because of the harvesting of the samples in the studied field.

Later on, the maps of truncations, fragmentations and parabolic effect consecutive to implementing the array of sustainable space is shown (McIntyre, 1993). Furthermore, an array proposal in a final map is projected.

SUSTAINABLE AND REGIONAL DEVELOPMENT THEORY

The term *sustainable* emerged from the philosophy of economical liberalism in which it was considered as a goal to achieve. In fact this theory was developed in the seventies in where several concepts of sustainable development were established as follows:

It is the appropriated life promotion, dynamical equilibrium, harmonic convergence, integral ethics, intuitive rationality, and planetary consciousness with the management of the natural resources and its preservation to the future generations (Dollfus, 2007).

According to the 1969 Economics Nobel Prize winners, Ragnar Frisch and Jan Tinbergen, it is also the sustainable growth of individual income and the sustainable long term structural process characterized by the progressive enhancing of the relative participation of the second and third sectors on the gross internal product of the country.

On the other hand, the Regional Development consists in a process of structural shifting placed on a territorial network called region. This theory has three branches according to Peter Haggett (1971):

A. The Landscape branch
B. The Ecological branch
C. The Locational branch

Next the SSM steps are developed.

NON STRUCTURED PROBLEMATICAL SITUATION

An analysis of the environment and inner system under economical, political, and social points of the tourist corridor from Port Angel to Mazunte in Mexico is done.

The diagram in Figure 1 shows that the tourist system (Godfrey, 1994) of the corridor is integrated in a subsystem called Coast of Pacific. Moreover this subsystem is integrated in a bigger system called Coast Sea Zone (Sanson, 1994) which is regulated by the Ministry of Navy and all of them within the coverage of the Mexican Republic.

The studied area of the corridor stays totally scrambled because of the bad decisions taken by the local and state authorities respect to the correct array in all its elements (Aguilar, 1987) that conforms this tourist corridor. For instance, the missing of hosting in the zone, the lack of basic services for social welfare, public safety, entertainment, school institutions, stores, local transport, telephone, and communications.

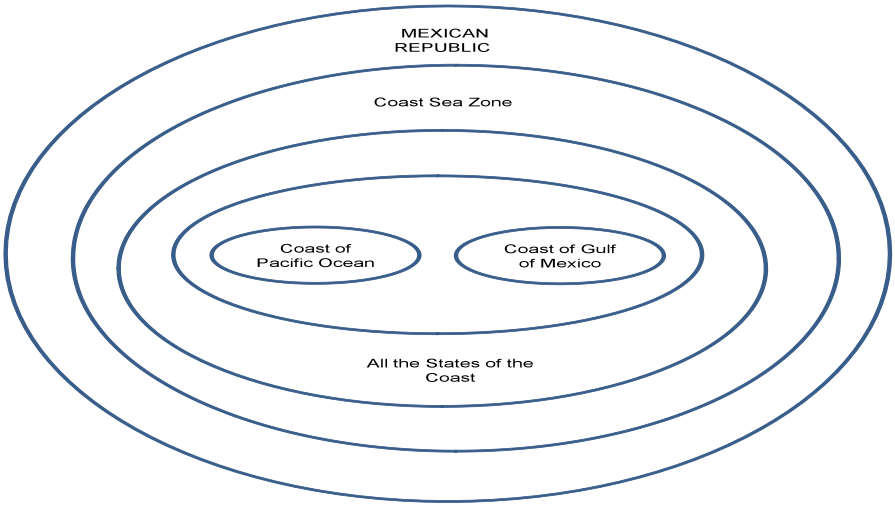


Figure 1. Location of the systems related to the tourist system of the corridor.

RICH PICTURE

In this section we analyze the interests' conflict relationships (Yang, 2010) among the main actors of the tourist system of the corridor through a net of nodes (icons) as shown in the diagram of Figure 2.

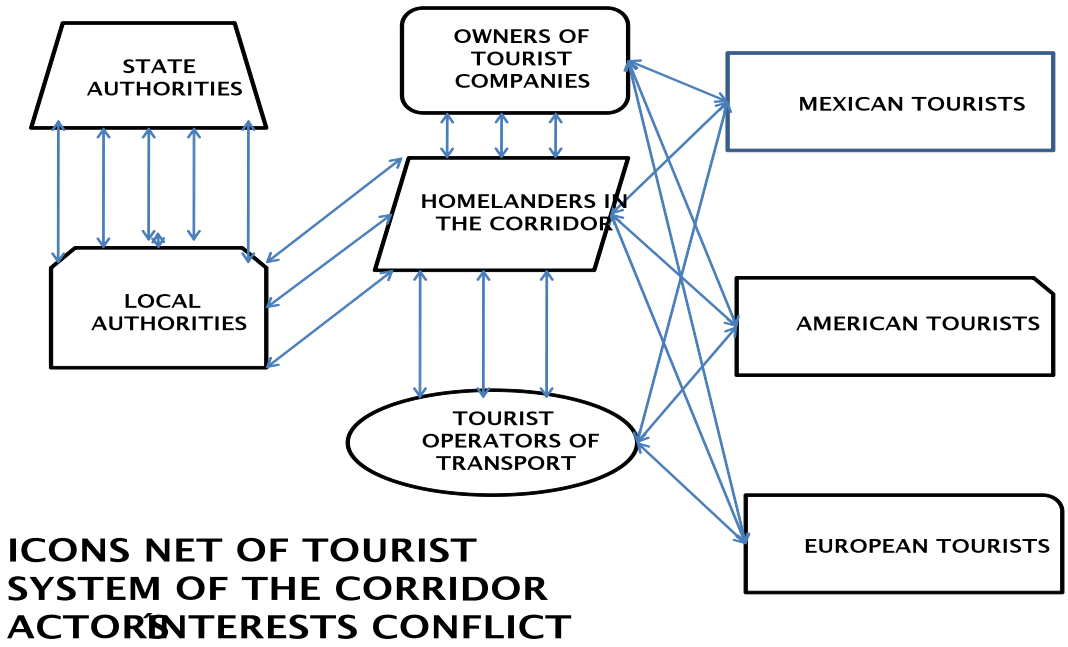


Figure 2. Actors' interests' conflict relationships of the tourist corridor system.

On the other hand, it is important to mention that in preparing the nodes net of interests' conflicts (Elizalde, Tejeida, Morales and Méndez, 2010) some questions and indicators obtained through personal interviews to 250 actors along the corridor are considered.

According to the Figure 2 it is important to point the most difficult interests' conflict relationships that there are among all the actors in the current system (Forrester, 1971): State and Local Authorities are very selective with the assignment of space and the type of project to develop because they only consider the personal interests and they do not have the experts to apply a correct array in the place (CODE, 1995). Besides they sell the space usage to owners with special public relationships within the government network (Yifang, 1994). Also tourists always are looking for good margins of safety, a quality service, and a low cost of transport (Gartner and Witt, 1994) and in most of the cases there are severe problems with the service that the tourist operators offer and with all the routes that they use to give the whole service. Moreover owners of tourist companies have many problems with planning, organization, direction, and control of the type of duty that offer (Hughes, 1994) and the type of tourist that they accept. Meanwhile settlements in the corridor are showing a change resistance to meet foreign people from North America and Europe (Buckley, 1994).

In the same context, the tourists need to have a complete safety and the best service from the tourist companies and operators of transport to enjoy their trips.

In fact we can emphasize the role of the inner institutions have to ensure the correct attention into the tourist vehicle units and the companies of all the involved actors. So the demand of services will be enhanced if all the tourist system works in a correct way and in quality terms.

Moreover most of the owners have a natural fear to offer the service because of the language barriers and the need to improve this situation in order to increase the income levels related to the operation and administration stuffs.

ROOT DEFINITION

In the particular case of Mexico, the usage of the tourist system in the corridor generated the root definition emerged from the interpretation of the icons net of interests' conflict relationships with the aid of the CATOWE mnemonics (Checkland, 1990) detailed in Chart 1.

So the development of this research paper is based on the last branch which sees the geography as the study of location of phenomena over the land surface (Haggett, 1971), as in Chart 1.

Chart 1. Application to the system model with the SSM and the mnemonics CATOWE

CONCEPTS	STRATEGIC OBJECTIVE	GROUP OBJECTIVE
C CLIENT	Local Tourist American Tourist European Tourist	Tourist System Tourist Services Tourist Incomes
A ACTOR	Settlement of the Corridor	Involved Authorities
T TRANSFORMATION	Substantial shifting in the way for sustainable array of tourist space	Applying of effective and inedited knowledge related to the sustainable array
O OWNER	Owners of lands of Corridor Owners of Transport Operators Owners of Companies	Apply a Quality System for improving productivity and income levels
W WELTANSCHAUUNG	A guide to solve in a polite way the operative and administrative decisions related to the sustainable array of the tourist corridor	To change the consciousness of the tourist companies to get better income levels through the best given duty to the tourists
E ENVIRONMENT	Normative, professional	Social and governmental

DETECTING OF ACCIDENTATIONS

The next calculations to find the Impact Area are made following the formulation given by Sabol, Bufford, and Crawford (2000).

S = IMPACT AREA

A = 45°

b = 10,000 meters

$$S = \frac{(C)^2 (\sin 2A)}{4} \qquad C = \frac{b}{\cos A}.$$

Using: $C = \frac{10{,}000}{\cos 45°} = \frac{10{,}000}{0.7071}$

$= 14{,}142$

$$S = \frac{(14{,}142)^2 (\sin 2(45°))}{4} = \frac{(200{,}000{,}000)(\sin 90°)}{4}$$

$$= \frac{(200{,}000{,}000)(1)}{4} = 50{,}000{,}000 \text{ m}^2$$

The Impact Area obtained is S = 50 km^2.

Now it is convenient to define the main concepts for this methodology before its application:

Truncation. It is a natural phenomenon placed in a linear way that provokes constrains with the usage of the land in the array (Sabol, *et al*., 2000).

Fragmentation. It is a main productive center that is supplied from two isolated cities (Sabol, *et al*., 2000).

Parabolic Effect. It is the effect as a consequence of the implementing of a project translated as a common benefit to the homeland of the social, economical and life type to enhance the life level (Sabol, *et al*., 2000).

Muffling Measure. Immediate solutions to diminish progressively the intensity of a periodic phenomenon (Leopold, 1971).

Alleviating Measure. Feasible and available solutions to control the adverse impacts generated (Leopold, 1971).

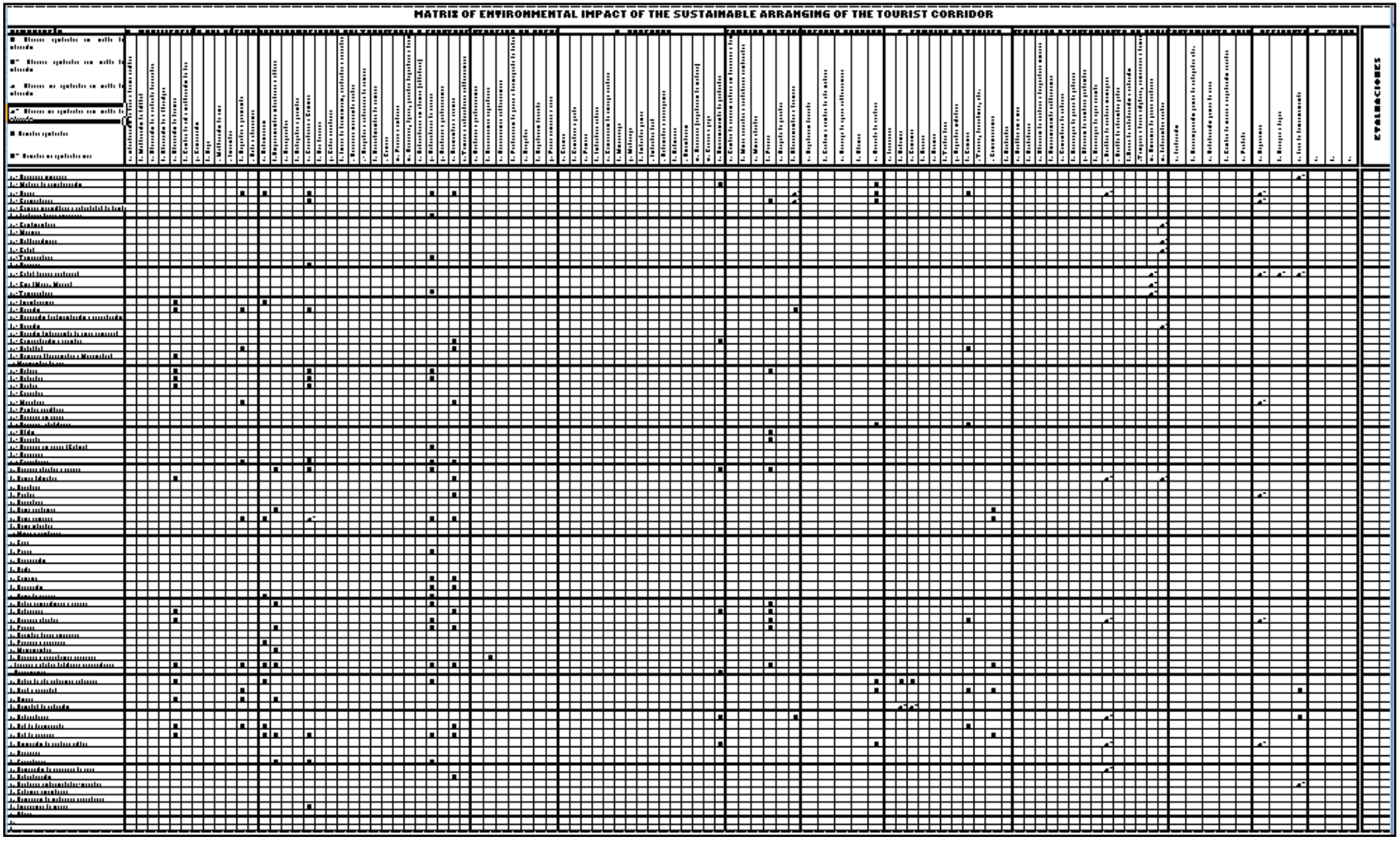
Prior to identifying the accidentations in the corridor we must analyze the Matrix of environmental impact shown in the Chart 2 (Leopold, 1971), that comprises the following:

- A potential reception area
- General factors
- Biotic factors
- Non-biotic factors

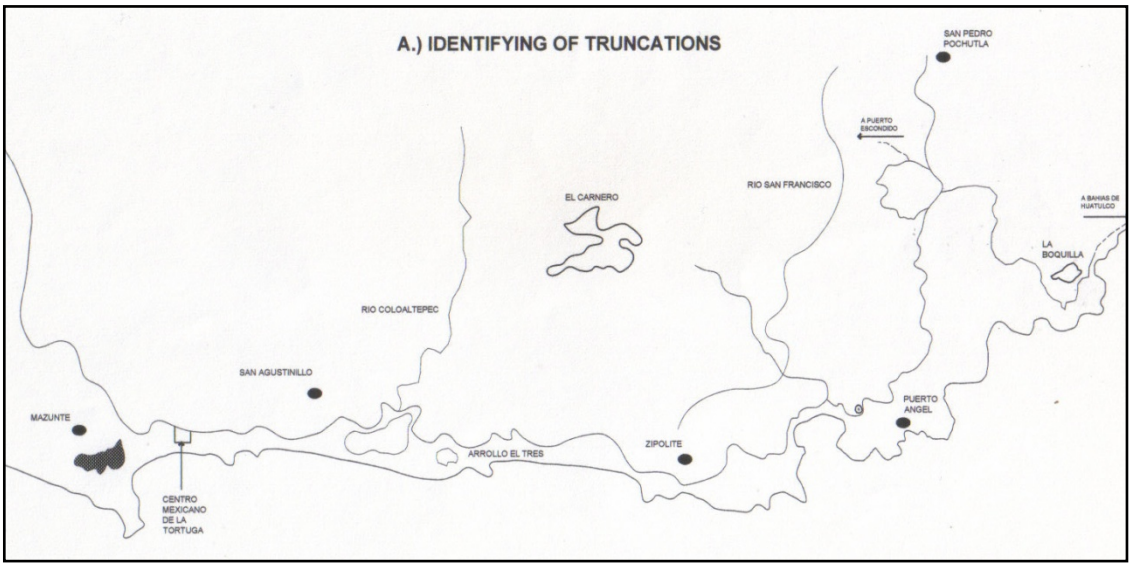
Besides this, the next factors are evaluated using the scale given by the World Conservation Union, the United Nations Environment Programme, and the World Wide Fund for Nature (IUCN, UNEP, and WWF, 1991):

A Meaningful Adverse without Alleviating Measure
A* Meaningful Adverse with Alleviating Measure
a Non Meaningful Adverse without Alleviating Measure
a* Non Meaningful Adverse with Alleviating Measure
B Meaningful Benefit
B* Non Meaningful Benefit

Chart 2. Matrix of Environmental Impact of the Sustainable Array of the Tourist Corridor

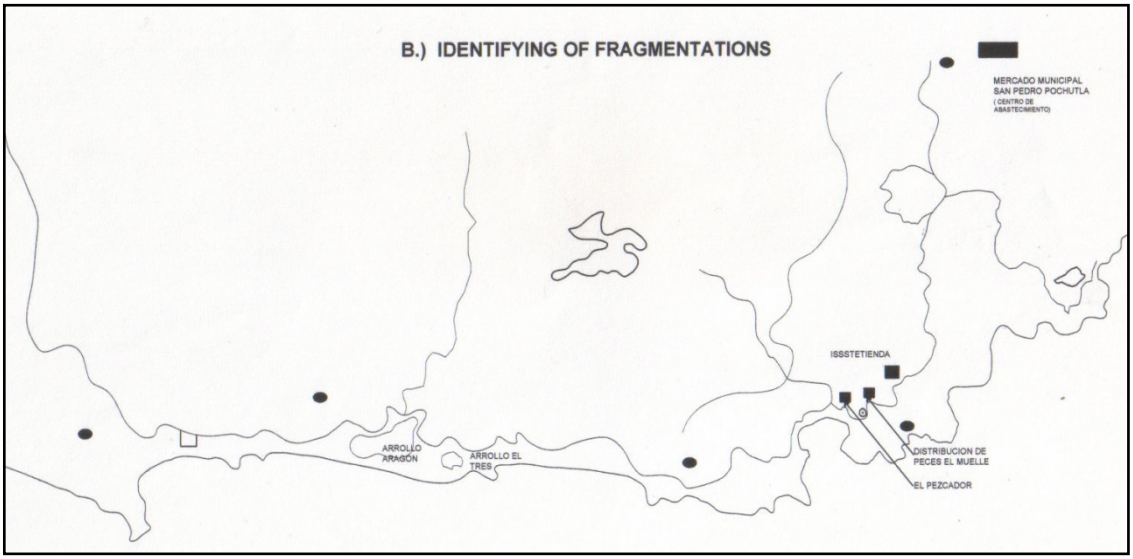


After analyzing the Matrix of Environmental Impact the accidentations are detected with all the air photographs of the studied zone (Pearce, 1989).



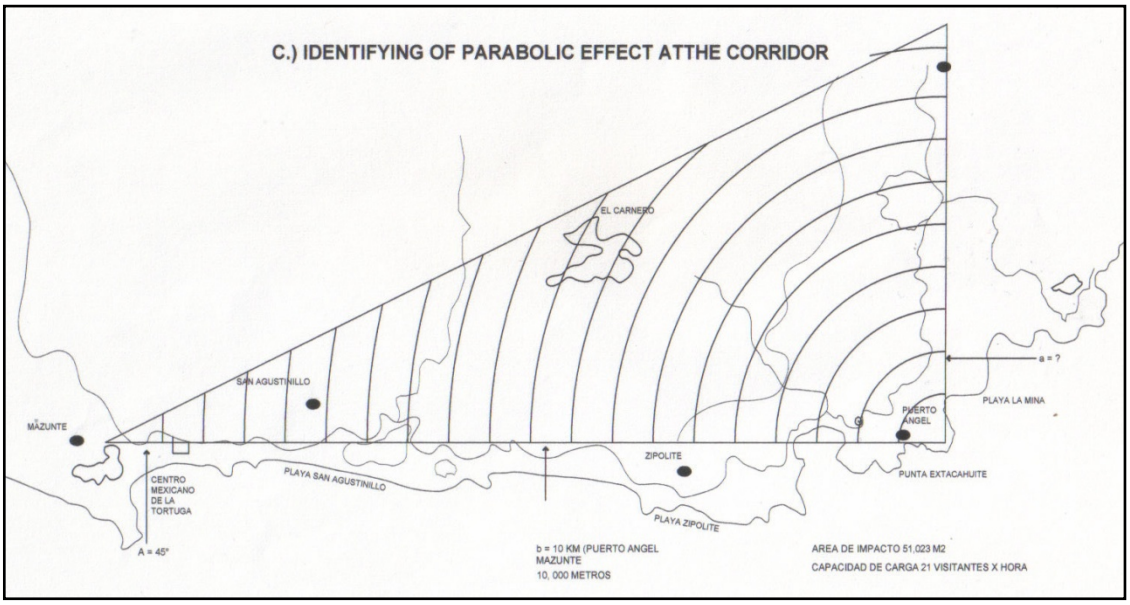
Map 1. Detecting of Truncations

According to the Map 1, the main truncations are: Mexican Center of Turtle, Coloaltepec River, The Three Streams, San Francisco River, The Ram canyon, the Mazunte, San Agustinillo, Zipolite, and Port Angel beaches.



Map 2. Detection of Fragmentations

According to the Map 2, the main fragmentations are: Aragon and The Three Streams, Fishman and ISSSTE stores, the main mall in Pochutla, Commercial distributor of the wharf.



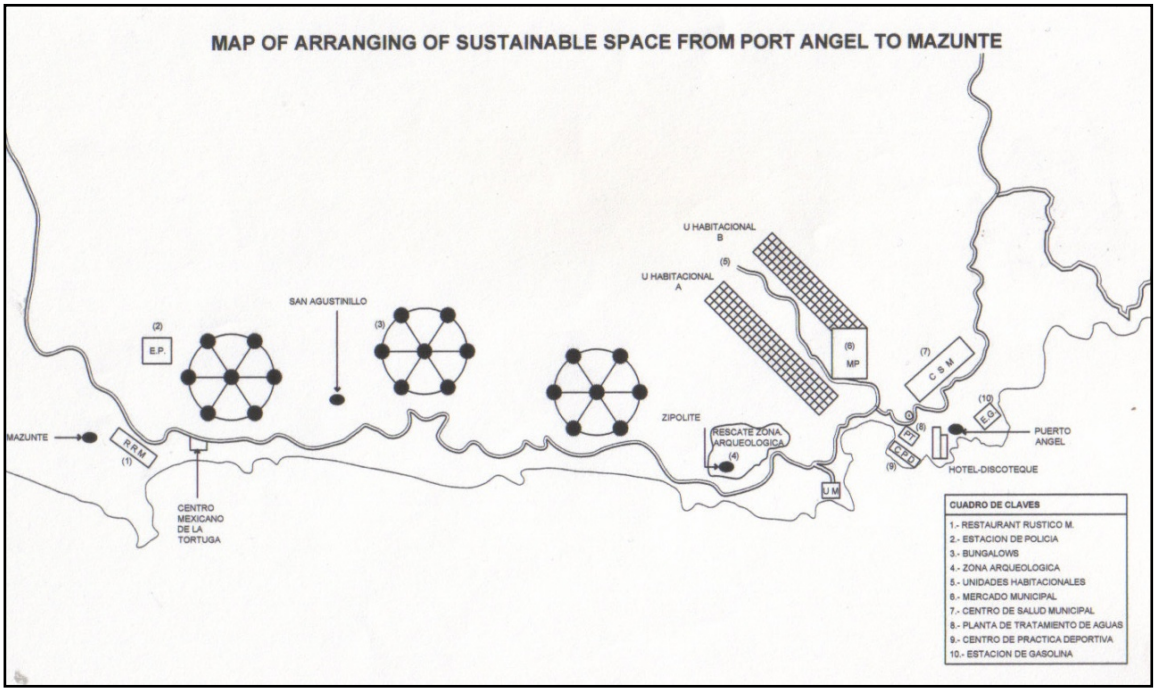
Map 3. Detecting of Parabolic Effect of the Tourist Corridor

According to the Map 3, the parabolic effect loads toward the east part of the corridor covering 10 kilometers along the coast.

INTERPRETATION OF OBTAINED RESULTS

We analyzed all the accidentations and noted a lack in the facilities, structure and infrastructure in the zone. That is why we can infer that the elements that the corridor needs to pass from an economical growth to an economical development (Perroux, 1999) are shown in the Map 4. According to this Map the implementation of the following elements into the touristic corridor is proposed:

1. Police station office
2. Rustic restaurant in Mazunte
3. A zone of rustic bungalows
4. Rustic host unit A type
5. Rustic host unit B type
6. Local mall at Pochutla
7. Sports practice center
8. Improving of the residual waters engine
9. Local taxis
10. Rebuilding of the archaeological zone in Zipolite
11. Local social welfare center
12. Oil station



Map 4. Sustainable Space Array of a Tourist Corridor

It is important to emphasize each one of the elements proposed in the Map of Sustainable Array as follows:

The Rustic Restaurant at Mazunte will serve to welcome all the visitors of the Turtle's Mexican Center and the San Agustinillo Beach (Municipio de Santa Maria Tonameca, 2000). Besides the Police Station Office will care the public safety along the corridor. Furthermore the Bungalows chain will protect San Agustinillo and Zipolite beaches from the erosion through the grazing along it. Also the archaeological ruins will be rebuilt according with a map elaborated by Brockington (1966) in his doctoral thesis. Moreover two rustic host units for settlement will be built in a special part of the corridor. Notwithstanding there will be an implementation of a local mall and a social welfare center near the main settlement and in a rustic focus. At the same time a residual waters engine (Albert, 2006) will be improved near the wharf. Even an oil station will be implemented in the same place. Finally, a sports practice center will be integrated along the low part of the main beaches (Municipio de San Pedro Pochutla, 2000).

CONCLUSIONS

As a result of applying the Soft Systems Methodology to the tourist corridor study case in Mexico it can be inferred that the stakeholders must adopt the following improving actions to increase the level in the conservation and preservation stuffs.

Concerning the main muffling measures:

- Implementation of roads and ways;

- Commercial expansion in the dessert area along the corridor;
- Implementation of drainage linking to the residual waters engine;
- Implementation of vehicle emissions control program;
- Implementation of the *5S* program;
- Integrate rustic and tourist stuffs to support the ecotourism image;
- Implementation of catalytic devices for industries and cars operation;
- Foresting along the corridor to prevent damage because of future hurricanes;
- Training for environmental education for settlement and visitors in the zone.

Regarding the main alleviating measures:

- Control of local residuals wastes of garbage;
- Control of local residuals liquids of nearby industries;
- Landfill of trash separating the recycling material to convert it;
- Clean the continental platform from waste and garbage;
- Monitoring the application of quality standards in processing industrial wastes;
- Control the use of necessary exploit into the environment to avoid ecological damage;
- Supply grazing to avoid damage in landscaping areas;
- Control the rational resources use at the region as the wood and the type of land;
- Preservation of endemic species as the *Plicopurpura pansa* snail and the *Golfina* turtle.

Finally, it can be concluded that this sort of sustainable array supports all the actions that protect the whole environment in consideration to all species and the correct management of the natural resources to preserve them to the future generations and so the human being would not be another endangered species.

REFERENCES

Aguilar, A. G. (1987). Las Bases del Ordenamiento Territorial: Algunas Evidencias de la Experiencia Cubana. *Revista Geográfica*. 109(1): 87-111.

Albert, L. A. (2006). *Curso Básico de Toxicología Ambiental*. Limusa, Mexico.

Brockington, D. L. (1966). *The Archaeological Sequence from Sipolite, Oaxaca, Mexico*. University of Wisconsin Press, Madison WI.

Buckley, R. (1994). A Framework for Ecotourism. *Annals of Tourism Research*. 21(3): 661-665.

Checkland, P. (1981). *Systems Thinking, Systems Practice*. Wiley, Chichester.

Checkland, P., and Scholes, P. (1990). *Soft Systems Methodology in Action.* Wiley, Chichester.

CODE (1995). Ordenamiento Ecológico. *El Tecolote*. 12(Separata). Mexico.

Dollfus, O. (2007). *La Mondialisation*. Les Presses de Sciences Po, Paris.

Elizalde-Medrano, A., Tejeida-Padilla, R., Morales-Matamoros, O., and Méndez-Díaz, J. (2010). The Soft Systems Methodology on the Implementing of a GPS System, in the Trucking Companies. In *Governance for a Resilient Planet: Proc. 54th ISSS Meeting*: 125-133.

Forrester, J. W. (1971). *Principles of Systems*. Productivity Press, Portland OR.

Gartner, W. C., and Witt, S. F. (1994). Tourism Research in the 90s. *Annals of Tourism Research*. 21(2): 422-424.

Godfrey, K. B. (1994). Book Review: Developing Tourism Destinations, by J. Bodlender, A. Jefferson, C. Jenkins, and L. Lickorish, Longman. *Annals of Tourism Research*. 21(4): 874-876.

Haggett, P. (1971). *Locational Analysis in Human Geography*. 2nd Ed. Edward Arnold Publishers, London.

Hughes, J. (1994). Antartic Historic Sites: The Tourism Implications. *Annals of Tourism Research*. 21(2): 281-294.

IUCN, UNEP, and WWF (1991). *Caring for the Earth: A Strategy for Sustainable Living*. Earthscan, London.

Leopold, L. B., Clarke, F. E., Hanshaw, B. B., and Balsley, J. R. (1971). *A Procedure for Evaluating Environmental Impact*, Geological Survey Circular 645, United States Department of the Interior, Washington DC.

McIntyre, G., Hetherington A., and Inskeep, E. (1993). *Desarrollo Turístico Sostenible: Guía para Planificadores Locales*. Organización Mundial del Turismo, Madrid.

Municipio de San Pedro Pochutla (2000). *Municipal Population Center Plan*. December 15th, 2000 Edition, Mexico (In Spanish).

Municipio de Santa María Tonameca (2000). *Municipal Population Center Plan*. December 15th, 2000 Edition, Mexico (In Spanish).

Pearce, D. (1989). *Tourist Development*. Longman, London.

Perroux, F. (1994). *L'économie du XXe Siècle*. Presses Universitaires de Grenoble, Grenoble.

Sabol, J. G., Bufford, L., and Crawford, O. (2000). *Regional Development Methodology: Dimensioning Regional-Physical Space*. British Council, Mexico.

Sanson. L. (1994). An Ecotourism Case Study in Sub-Antarctic Islands. *Annals of Tourism Research*. 21(2): 344-354.

World Bank (2010). *World Development Report.* The World Bank, Washington DC.

Yang, J. (2010). An Approach Applying SSM to Problem Situations of Interests Conflicts: Interests-Coordination SSM. *Systems Research and Behavioral Science*. 27(2): 171–189.

Yifang, C. (1994). Evaluation of Sightseeing Areas in China. *Annals of Tourism Research*. 21(4): 837-839.