

**Sustainability assessment system of natural resource  
management for tourism in the community of San Pedro  
Atlapulco, the State of Mexico, Mexico**

**Nuchnudee Chaisatit**

**Virginia Reina Martínez Hernández**

**Jesús Otoniel Sosa Rodríguez**

**María Adelaida Silvestre Campos**

*Nuchnudee Chaisatit: Lecturer and researcher of the Tourism and Gastronomy School of the University of Colima, Mexico. E-mail: nuchnudee@ucol.mx*

*Virginia Reina Martínez Hernández: Lecturer and researcher of the Faculty of Chemistry, University of the state of Mexico, Toluca, Mexico. E-mail: vrmh@uaemex.com*

*Jesús Otoniel Sosa Rodríguez: Lecturer and researcher of the Tourism and Gastronomy School of the University of Colima, Mexico. E-mail: otonielsosa@ucol.mx*

*María Adelaida Silvestre Campos: Lecturer and researcher of the Tourism and Gastronomy School of the University of Colima, Mexico. E-mail: adelaida\_scamos@ucol.mx*

**Abstract**

San Pedro Atlapulco is a rural indigenous community of; it is located in state of Mexico together with the Insurgente Miguel Hidalgo y Costilla national park. The former population worked as peasants and sold natural resources, but unfortunately the community has never received some support from the government sector. Nowadays, the principal economy is based on tourism because of the availability proximity of conifer wood) which makes a suitable environment in the valleys which manages the tourist's activities such as horse riding, All Terrain Vehicle (ATV), hiking, Picnic, etc. There is some effect necessary to be evaluated in order to preserve and take advantage for eco-tourism and the need to research the opportunities for its sustainable use and adequate management. The main objective of this investigation is to evaluate the sustainability of the recreative tourism activity through social indicators and the possibility of incorporating this resource to the tourism activity with the aim of proposing an eco-tourism alternative for the community of San Pedro Atlapulco, State of Mexico which would allow strengthening of the tourism product and consequently would present opportunities for the improvement of the quality of life for the residents. The methodology to be used was model to evaluate the Management of the Natural Resources System Incorporating Indicators for Sustainability (MESMIS), which consists of integrating experiences and recommendations of different institutions, which have been working on the development of methodologies to evaluate the management of the sustainability of natural resources.

**Keywords:** Recreative activity, Wood, Sustainable development, Eco-tourism, San Pedro Atlapulco

## **Introduction**

The neoliberalism as an economic doctrine has generated many economic and social problems, created by the lack of productive opportunities for the rural and urban populations, due to the globalization process same that is quickly expanding in countries all over the world. The neoliberalism is polarizing societies in its eagerness to integrate them to the international economy. With the thinning of the state the possibilities of equal growth and satisfaction of social needs have been drastically reduced. Farmers are currently the most affected because they do not have the possibilities to join the new economic model, the export agriculture. In this sense people is forced to emigrate accepting jobs in very unforgiving circumstances, or they're forced to look for other surviving options like craftsmanship or in other cases incorporate natural and cultural resources to the tourism. Due to the abandonment of the government support farming communities returned to their old ways of participation to generate better profits. Currently several communities are making efforts to join other activities like tourism.

The tourism is an important alternative for rural communities, because in the past years the support politics for the farmers have been scarce and that let them without choice but to take advantage of its natural and cultural resources to push their own development, through the offering of recreational tourism to improve their earnings.

This is what happened in San Pedro Atlapulco a rural community of indigenous origins that previously engaged in agriculture: harvesting wheat, oat and corn and the sale of natural resources such as wood and charcoal.

Currently the economy revolves around the practice of tourism for its closeness to the coniferous forest that provides a pleasant environment. This community is integrated by seven valleys: valle del conejo, porterto, Rancho Viejo, Silencio, Cerrito del Angel, Las monjas y Las Carboneras; of which only the first four have touristic activities.

This community doesn't have lands that provide support that's why they've seen in recreational tourism a profit opportunity, that's planned by a community organization that determines the way the natural resources are used such as woods, land, and mainly water.

The community of San Pedro Atlapulco has a vast woods richness mainly of pine trees and fir. However they are not used in a proper way by its population, limiting their use of woods and taking advantage of the valleys for the development of recreational touristic activities. The touristic services offered at the valleys are rent of ATV's, horseback riding, food and drinks, sale of crafts and toys among others, this activities generated deforestation, woods fires and the soil erosion; in a way that constitutes factors that affect the environment and the woods of the community.

It is considered that the sustainable development is the alternative mean to support the natural resources, specially woods that are the main resource of the community, from this approach solutions are provided to solve the environment problems of the forest

From the perspective of sustainable development arises the study of tourism, considering the postulates of the World Tourism Organization (UNWTO) that points out that not just the needs of current tourists and receiving regions should be met but also has to protect and

foment future activities. Considering tourism as a mean for development through manage of resources in a way that satisfies the economic and social needs respecting the cultural integrity of essential ecologic processes, ecologic diversity and the systems that support life.

The research was developed with the methodological proposal of the framework for the evaluation of natural resource management systems, incorporating the sustainability indicators from economic and social environmental indicators.

The life of the people from San Pedro Atlapulco have been related with the forest since pre-hispanic times, because from them water, fresh air, wood, mushrooms and medicinal plants are obtained.

In pre-hispanic times the forest were not commercially used but used for self-consumption with the hunt of animals like the wild chicken, rabbits, among others and the use of medicinal plants like the carricillo, pata de leon, lengua de vaca, gordolobo, flor de ocote among others. They also used the wood to build cabins.

Since colonial times San Pedro Atlapulco has delivered charcoal as a tribute to the Mint during the 1700-1900. Charcoal was the main fuel of the time and was sent to Mexico City. They also produced Pulque, crafts made with still life and wild seeds for its sale in local markets.

From the year 1900 the population started to protect the forest and reduce the over use of natural resources like wood or charcoal of dry trees that were sold in close communities, without putting aside the agricultural activities that always accompanied the development of indigenous towns in Mexico. The valleys of San Pedro Atlapulco where the touristic activity is taking place today, used to be meadows for grazing of animals and croplands; harvesting wheat, beans and oat.

The tourism attractiveness of this region lays essentially on its natural resources. The preservation of its forest has motivated the arrival of visitors to take part in outdoors recreational activities such as sports, horseback riding, camping, hiking and family time.

The touristic valleys are very popular especially on weekends and festivities to rest, breath fresh air and to do outdoors activities. This zone offers its services to visitors from big cities mainly.

By the above it's important to evaluate the activities that the community does in function of its natural resources, arising questionings such as: is the way the forest is used in San Pedro Atlapulco sustainable? What's the role of the community in making sure that the activities taking place in the forest are sustainable? What ecotourism options could be implemented in the community?

### **The community of San Pedro Atlapulco, State of Mexico**

The studied zone is located in the community of San Pedro Atlapulco that belongs to a section linked to the Toluca valley in which the basins and mountain system belong to a region known as the central highlands of Mexico.

The community of San Pedro Atlapulco is part of the municipality of Ocoyoacac Mexico State. The territory of the community is located between the limits of the Miguel Hidalgo national park and Acazulco; just 10 KM from the Marquesa-Chalma highway, Atlapulco communicates with Capulhuac and Santiago de Tianguistengo.

Two kinds of property exist in San Pedro Atlapulco: communal and private. The presidential resolution confirmed in definitive way Atlapulco's communal goods giving it a definite extension of 7,110 hectares, communal property is formed by three polygons: the first one of 6,271 hectares that corresponds to Atlapulco; the second one of 654 hectares called San Miguel Amaya; and the third one of 184 hectares is Santa Maria Coaxusco. Although they're three different polygons, the legal representation falls in the hands of the commissioner of community property of San Pedro Atlapulco.

The polygon that corresponds to Atlapulco it is divided in four zones: forest, touristic, agriculture and urban. 6,915 hectares belong to the forest zone with forests of pine trees, firs and oak a small part belongs to the agriculture zone. The fauna is abundant there's squirrels, rabbits, birds, reptiles and possums. Its water supply is abundant because it has several creeks that come from the high parts of the community: the hills surrounding the community.

### **Physical and biological characteristics of the ecosystem of San Pedro Atlapulco**

San Pedro Atlapulco is considered the third highest locality in Mexico, situated above 3,010 meters over the sea level, situation that allows it to provide an admirable sight of the Toluca Valley framed by the Xinatecatl volcano and the growing urbanization and industrialization of the city of Toluca, that everyday fuses itself with the ancient farmer towns of the region. The zone has low temperatures and a relatively more uniform humidity than the neighboring basin of Mexico. Modern weather maps based on the Koppen classification, put the Toluca Valley as C(w2)w1 at the lower parts or sub-humid temperate with summer rains, but in the mountain zone of the Marquesa region is defined as c(E)(w2)w2 which is equivalent to sub-humid semi-fredden with summer rains. The average yearly temperature ranges from 10 to 12 degrees Celsius and the average rain is 900 millimeters per year.

The climatic disposition shows a great uniformity under the 2800 meters over the sea level where the temperature ranges from 12 to 14 degrees Celsius, being the eastern part slightly colder. The community is slightly over the 2,800 meters over the sea level that's why the temperature descends two degrees Celsius.

The conifers forest of the community provides and replenishes the groundwater. There is springs that supply the municipalities of Huixquilucan y Lerma and D.F. They're not part of Lerma's water basin but they supply the municipality with drinking water. The community has a usufruct agreement on water and the forest. Because this forest is located in the middle of Toluca, D.F. and Lerma it absorbs the pollution of these cities that's why they look defoliated in comparison with the forest in the south part of the community. Those are the greenest and flowery woods but also the more isolated from the population. It's one of the forests with problems caused by the urban growth and modernization, and is noticeably by the lack of natural regeneration.

### **The organization in San Pedro Atlapulco**

There is a representation through the commission of community property in the same agricultural regime, that's formed by a president, a secretary and a treasurer. There is also a counsel of vigilance also called agricultural core that takes care of the forest and all the materials and resources on it.

In relation with the commoners that work inside the touristic valleys, these have to fulfill certain requirements. To be able to utilize the forest ecosystem its required to be originative of the community, request a written permit to the commission of community property, in which you note your request, that is regularly obtained through a permit of wood utilization, which will be used to elaborate beams, planks or other things, and the main advantage is that the given permit is free.

The population assures that the forest has an indirect importance in their life, because people do not depend on the use of this resource because the population has other jobs that had allowed them to improve their living standards in past years.

Because of the abundance of the forest the community has a really nice environment; it is recognized as a really important lure for the tourism, because nowadays the big cities does not have many recreational spots for their population, that is how the valleys of San Pedro Atlapulco cover the need of recreation for the large metropolitan zones, like Mexico city and Toluca. At the same time the commoners had been benefited by the great demand of their valleys and services they offer, that is how the tourism is now the main activity, job generator for the community and the main source of support for the families that belong to San Pedro Atlapulco.

### **The recreational touristic activity in the touristic valleys**

Since the 40's the population started to participate in the tourism creating routes for hikers that arrive to the Miguel Hidalgo Y Costilla National Park better known as la marquesa, the profit were low due to the lack of visitors, it was until the 70's with the opening of the highway la marquesa-chelma that connects to tenango del valle that the recreational zone of la marquesa extends to the valleys of Atlapulco. That's how the valleys organization emerged so that all the population from the community had the opportunity to participate in tourism as long as they were from the community.

Up until now there are 8 valleys were the touristic activities are developing: Valle Del Potrero, Conejo, Zarco, Carbonera, Cielito Del Angel, Rancho Viejo, Silencio and Las Monjas. The activities that are currently offering for the tourists in the valleys are: rental of ATV'S, horseback riding, rowing on the lake, outdoors games area, recreation areas, food sale, and picnics.

### **Method**

According to the model to evaluate the Management of the Natural Resources System Incorporating Indicators for Sustainability (MESMIS), the sustainability of a natural resources handling system, can be only evaluated in a comparative way, comparing it with

another system. In this case it was decided to do a comparison between the time of the handling system before and after doing the touristic activities.

Described below are the general characteristics of both handling systems before the touristic activity in the valleys. In the other hand following the MESMIS methodology an analysis was proposed based on five general attributes of the sustainability, productivity, equity, stability, resilience, adaptability, and self-management. For this it was necessary to identify critical points and attributes of sustainability.

To evaluate the environmental impact of tourism and recreational activity on the community of San Pedro Atlapulco's forest, the main critical points relate to the determinants of the water resources, soil, forestry and community organization before and after the presence of tourism, when the villagers began to deforest and open valleys to tourism the environmental issues began.

The importance of the community forest can be classified by:

### **1) Social Context**

MESMIS's methodology, the community of San Pedro Atlapulco is a community that has high self-reliance for its form of organization and participation as communal. Although the community belongs to the municipality of Ocoyoacac but the community has the Supervisory Board of Communal Property for permission to authorize and finally with the Commissariat of Communal Goods.

The rule of the community on the use of the community forest, you have to ask permission for the processing of the Supervisory Board of Communal Goods as tourism in the valley. The trees are felled allow sick or old trees that no longer good for the forest. The community of San Pedro Atlapulco won the award for the reforestation of the state government of Mexico.

Reforestation is required within the community. Each family must participate reforestation each week, if a family does not comply will not be able to work a weekend in the valleys.

### **2) Economic Context**

As I mentioned, for the abundance of forest that attracts tourists from metropolitan areas to come to visit tourist valleys and tourist activities is shifting agriculture today is only for home consumption.

The community began to develop tourism from thirty years old when the Mexico-Toluca highway opened. People from nearby towns and metropolitan area who came to buy natural resources such as firewood and charcoal rented horses to climb the Monte Alto and the villagers realized that this activity is an alternative to improve their quality of life and began to make tourism activities in Potrero Valley to date are the seven valleys mentioned.

For the frequency of reforestation, forest community is very healthy and density but not exploit the community for not having confidence if the forest is going to end. In 1996 the forest management program started by the Ministry of Environment and Natural Resources and Fisheries (SERMARNAP) Resources. As I mentioned that the main objective of the

program is to exploit the forest resources for commercial and forest dynamics. But people do not want to exploit although activity can improve the condition of life of the populations.

### 3) Environmental Context

In the community of San Pedro Atlapulco wealth nature has not only the forest of conifers (pine, fir, pine sticks) but also the Hydrological resource which is interrelated with the forest.

What's methodology MESMIS by indicator environmental degradation of tourist activities is the environmental effects such as erosion and soil compaction that will have consequences for the forest degradation because the edaphic community resource is transverse volcanic system that is very fragile and easily lost to water and wind. The forest helps keep the soil from erosion.

Evaluation of the sustainability

#### Productivity.

For the attribute of productivity the indicators that were selected are yield of the wooded area and profitability. The yield, in other words, the growth rate of forest reforestation, is hard to measure, but an estimate is made from the information of the Government of State of Mexico's forest use program. The profitability was calculated using a cost-benefit analysis to consider the total economic value of the tourism activity being undertaken, in other words what is the monetary, nonmonetary or environmental benefit that are result of the maintenance and use of forest resource.

Table 1. Management system compared before and after tourism

System determinants		Before Turism (prevailing to 1996)	After tourism (Since 1966)
Original biofisics			
Technology and management	Resource characteristics	Conifer forest, pine, fir	Conifer forest, pine, fir, oak
	Forest harvesting techniques	No	Use dead trees for firewood, limited exploitation 15,000 m <sup>3</sup> per year ( started in 2005)
	Conservation practices	No	Forest management plan Reforestation program
Socio	Production target	Forest reserve	Forest and water reserve

		general use	commercial exploitation
	Characteristics of the organization for the production	Regulation of forest use for commoners	Regulation of forest use for commoners
	Benefits	No	The sale of timber and tourism

Reference: Field work

Regarding this attribute (productivity), we find that previously the main economy of the community of San Pedro Atlapulco was the agriculture, the condition of the forest was not as abundant now because the community members exploited the forest for personal consumption and sale of natural resources without measure, since 1996 when the Mexico-Toluca highway opened and tourism activity began in the tourism valleys they also started to replant and take care of their forests to attract tourists and get financial support from the government. As the forest, it does not pay off because there is not use of the wood, or the resin, its use is limited. What does payoff is the tourism valleys, and these are different because they depend on many aspects such as tourism service location, branch in which they work, season of the year and others. However, we can say that each week there are families that receive more than 5 thousand pesos and others don't even reach a thousand pesos.

Equity.

From the social point of view, it is very important to determine who benefits - and to what extent- with the monetary and nonmonetary products obtained from the forest and tourism. The diagnostic criteria that was selected was the distribution of benefits, and the indicators were: economic equity, income received by families and participation of the population in tourism. These three indicators were assessed through direct interviews.

In terms of equity, we can say that, it exists, because all Atlapulco born population has the right to exploit natural resources so everyone can work in tourism in the valleys of the community, if requested and are assigned their rights and are made aware of their obligations. Therefore, 80% of the economically active population is involved in tourism, so everyone benefits from the forest and valleys, either through the provision of a service or resource that it provides them with such as wood, firewood, water, clean air.

Stability.

The stability of the forest of the community of San Pedro Atlapulco depends on the Forest Management Program, as well as the directives of the Tourism Valleys and, on the other hand, the social-political context as well as internal stability of community organization and the cooperation with the federal government for the reforestation program.



Resiliency.

In the resilience's case, it results particularly difficult to identify relevant indicators, because of the difficulties found in wooded areas, valleys, foothills and springs. The forest management program and analysis of soil and water quality were taken as indicators.

In terms of stability they indicate that the conditions for joining a tourist service is in relation to their investment opportunities, and they can do it because they can participate in different branches such as horse rentals, ATV's, sale of food or candy, and the investment can range from 1,000.00 to 30,000.00 but the recovery of investment ranges from three months to a year depending on the branch and quality.

The stability of the management of the forest of the community of San Pedro Atlapulco depends on political, economic and social organization factors. The strategic indicators that were selected are: a) Degree of reforestation b) Extent of deforestation.

According to information from the forest management program, the data on the quantity of trees for reforestation in the year 2003 were a total of 2000 trees and in the year of 2004 3000 trees of pine and fir, the firs are those in the lowland and mountain foot and the pines are in the top because of the condition of climate, soil and light needs.

The reforestation program is held every year in the rainy season, the number of trees to reforest depends on the amount of rain and government support.

Regarding the degree of deforestation it's difficult to measure, the residents take advantage of dead trees or those with disease, which they use as fuel in restaurants and homes. Each year the community cuts down 15 000 m<sup>3</sup> of good timber trees to sell to the nearby communities. On the other hand, there is prohibited logging that has not been able to be controlled.

The community of San Pedro Atlapulco's forest has resilience, in other words it has the ability to recover, its high because of the volume of forest growth, even though it has difficulties because, as mentioned the farmers and fires cause the forest not regenerate, but the community is fixing these issues and seek the participation of 20 persons for the care of the forest. However, in the community there's a conflict of the political nature of forest exploitation and for this reason the management program is suspended.

Regarding the resilience of the soil, according to study samples and analysis of the Autonomous University of Mexico State edaphic laboratory the soil system in this area is very fragile. In the tourism valleys there's a problem of erosion and soil compaction. Worse it is only in the tourist areas because most of the soil of the community is unaffected. In the tourism valleys it's important to set aside areas for conservation.

The water resource of the area is abundant because of the amount of forest and rain, there are more than 40 springs. According to the analysis of water in the hydrological laboratory of the autonomous university of the state of Mexico the water is of good quality, has low turbidity and fulfills with the Official Mexican norm NOM-127-SSA1-1994, "environmental health, water use and permissible limits for human consumption, quality and processes that must be applied for water purification."

Self-management or self-reliance.

It is related to the ability of the commissioner of the community to take decisions regarding the management of forest resources and its tourist valleys. The selected diagnostic criteria was the level of organization of communal property management community. The indicators chosen to represent this attribute were the forms of organization, participation of community members and the frequency of meetings. To measure these indicators are formal and informal interviews and reviewed bibliographic and archival sources.

Self-management is given in the community through the way it is organized. Although San Pedro de Atlapulco is part of Ocoyoacac municipality, its form of government is independent. Its organization is communal, all the actions and decisions are taken at the General Assembly with the participation of all community members, seniors born in the town. This form of organization is based on communal ownership of land, which has driven development "from below", where the community is who promotes their development through natural resource management to solve problems without participation in most cases of external agents. This practice is composed of important factors such as identity, ethnicity, religion, education, a common past of its inhabitants, and the decisions taken in popular form in terms of their needs. All this has allowed a certain independence from government authorities at municipal, state or federal, where the rules and regulations governing the internal life are recognized and accepted by the inhabitants themselves.

Results

The results that have been found in relation to economic indicators on the cost benefit of the forest, is in its conservation to maintain clean air, good water and fuel. Its use is not because of timber cutting and sale, but in the use of the valleys for tourism purposes, so a proportion of its territory is intended for the community members' exploitation of natural resources. The investment cost is low because they often provide other resources such as horses, or consume wood for their food establishments, as the purchase of materials is minimal, or the purchase of ATVs. That is why the community members participate in various economic activities according to their investment opportunities. The income received for work in tourism activities are diverse, depending on the days worked, the branch and the valley in which they participate, and the influx of tourism. So we find people who can have an income of 5,000 per week or others with a thousand pesos. It is undeniable that the use of the valleys for tourism has led to the creation of jobs, since 80% of the community has jobs in tourism and have income to meet their basic needs.

Recreational tourism activities that are underway are showing some effects to soil resources, water and forest in this area. Eco-tourism could be one alternative for the community of San Pedro Atlapulco to exploit its resources, mentioned above, thereby improving the economic status of populations and the environment care.

The problems that are displayed in Atlapulco in relation to natural forest resource management is that the inclusion of tourism in natural areas has been done in an empirical way according to individual needs of tourism, little or nothing has been advised of specialists to manage their resources.

The concentration of activities in two valleys is causing soil depletion and general deterioration of natural resources in a matter of productivity in these areas is higher, which is why the population prefers to participate in these valleys and not in others. It is important to assess the effects of load capacity of these valleys and propose the diversification of others.

Although there is a communal orientation based planning, it is not appropriate since it does not allow the resource to be conserved, regenerate and control the erosion, due to tourism and grazing animals, as well as runoff and winds. It is necessary to reconsider the planning and resource management to encourage, maintain and preserve the tourist in the place and maintain in good conservation the forest.

The positive and negative effects from tourism

The use of the forest by the community is manifested in two ways, the first is the community: every person born within the community has the right to use the forest, as we mentioned in previous chapters, for which you must apply to the General Assembly Communards. The extension of the forest is represented by communally owned land within the community forest areas, populated by pine, fir, and oak mostly, these areas are not currently incorporated into tourism. The second is the lower area of the forest known as tourist valleys being communal land work individually through households. This is through the organization of small groups that decide to provide some tourist services in a natural area.

The existence of the natural forest and water resource materials generates environmental benefits for all the people that operate directly, and. Tourism activities that take place in the park are mainly done using the natural resources that once were exclusively for farming activities. The natural environment is the essential foundation for the development of tourism, so that the forest and valleys are the main element of this place tourist attraction and tourism the main source of income for the community. The use of forests for tourism as an economic activity in the community has meant that there Atlapulco currently overexploitation of a tourist valleys, such as El Potrero, where tourism is more concentrated and in response the tourist services food, horses, ATV's, sweets, handicrafts and currently sports like gotcha and tirolina. This form of positive and negative participation EFET generated as explained below.

Negative Effects

Edaphology

The forest floor in San Pedro Atlapulco this not being adequately used from the perspective of sustainability, as it is commercially exploited for the logging of a less orderly fashion. Land use is limited. On the other hand, in the wooded area deforested areas exist for using the soil for farming purposes, which is leading to soil compaction and the benefit of a few people by the single use of the property.

The situation is different valleys, as its use for economic purposes is satisfactory. However, the lack of a system of ecological tourism in the valley by the managers is causing soil compaction and damaged green areas exist. This is because they have not been incorporated

adequate to determine the number of visitors and service Dales although it is known that the influx of tourists is low during the week and only increases the weekends, mainly on Sunday measure, which makes this day the villagers try to make the most of its action. Moreover, it lacks regulations for tourists in the absence identifying areas for: parking, food areas, horseback riding, playgrounds for outdoor games, and others.

The valleys are generally deforested, but this effect is not due to tourism, but opened to expand farmland. Currently there are recreational areas, however they are not part of the actions to improve the natural resource community, and have been dedicated to over-the valleys without taking measures for their conservation and preservation. The villagers feel they have much forest open for tourism therefore have no need to worry. Growing tourism demand on some valleys are saturated with these services while others are abandoned.

Regarding the resilience of soil, according to the study samples and of soil the Autonomous University of the State of Mexico indicates that the soil system in this area is part of Mexican neo-volcanic system is very fragile. In the high mountain part of the community is recovering soil by abundant vegetation and the forest that protect soil erosion. Also the floors of the valleys are recovered in the rainy season, when you lower the tourism and weekdays in no tourism and land use is not as intensive, so far, but clearly must take steps to ensure that the situation does not become unsustainable.

#### Hydrology

Water use in Atlapulco is low, the amount you get from the springs is 40% for the service of the community, of which 20% is for the valleys mainly used in ponds for growing trout. Only in El Potrero there are 6 of these tanks; some of which have a large high production because it allows them to restaurants fill the valleys. This has led to pollution of streams that do not have systems for wastewater treatment.

Moreover streams and creeks that pass through the valleys are contaminated by tourists, and there is no litter control, and the use made of these water sources is to be recreated using materials that pollute as paper, plastic and aluminum. We believe that we need a system for harnessing the springs that are found within the valleys.

Water supplies are mainly springs from which individual ponds that are operated privately generated; Moreover, the geological formation of the region makes the runoff from the mountains leading to the valleys which determines its location for the installation of fish farms and for the maintenance of an artificial lake in El Potrero Valley where there more tourism .

#### Forest

The form of exploitation of forest San Pedro Atlapulco is communal and has its history from pre-Hispanic times, which is confirmed by the provision of settled land in the agricultural census. San Pedro Atlapulco has significant timber wealth, but its use has been limited to local use for basic needs of the families of the community. It is a sensitive resource utilization through timber sales, which allow a permanent renewal of its action through reforestation. The way we are currently managing the forest has brought

considerable negative effects as we found an old forest, sometimes sick, and without this economically benefit the population.

The demand for recreational space tourism in this region, has pushed villagers to open more green areas, causing the deforestation of the lower parts of the forest, so far believed to have been deforested about 12 hectares. Moreover the villagers involved in the rental of horses have open trails to high mountain, which has brought cutting pines and firs. Newly way tourism is opening the top of the forest, helping the visitor conscious or unconscious damage to the forest.

Previously areas of the valley were for agricultural use and livestock but the change of land use to promote tourism farmers bring their animals to graze in the high part of the mountain where the animals are fed infants trees within the reforestation program. Farmers and their grazing habits are a major obstacle for reforestation because it is difficult to control the areas where they move.

Within the community there are political conflicts, regarding the use of the forest, as the population is not satisfied with the determination of SEMARNAT and therefore the forest management program is stopped.

The lack of community organization for forest exploitation has done that it has no adequate productivity and valleys no longer generate revenues before.

#### Social

As for the social, tourism has been used by those who have better political relations with representatives in turn to obtain land use permits advantageously getting better incomes and licenses. Moreover obtained permission to participate in the turns they demand as well as the construction of infrastructure and facilities such as cabins for tourism within the valleys.

Although there is a General Assembly where all the problems related to tourism are poured, unequal opportunities is evident as not everyone can establish their business where they want, in addition to people with private land exist within the valleys and cannot be asked to participate incorporating their land for the common good. This is due to the way the licenses and permits are allocated.

Tourism growth and individual form of exploitation of tourism resources causes inequalities and conflicts that have not been resolved as some others get more income from rental boats or horses, or the sale of food and beverages.

The population effectively argues that the forest resource has enabled them to improve their income, however, young people are no longer interested in further study because they believe they have secured work in the valleys. On the other hand, to have an income to secure young people who consider leaning toward alcoholism spending that income on consumption of alcoholic beverages.

Another important aspect is that the tourism work to be a new activity for the population has become an activity that requires continuing with the housework and perform other as the preparation of the foods sold in food establishments, out of the community towards the

valley, cutting firewood, and this has caused an imbalance in family life, especially of women where stress and new diseases such as diabetes are presented.

Positive effects.

There are many benefits that the population has had its forest resource, whose amount is pointing out according to the aspects considered:

#### Edaphology

The population considered to have given a new use for the floors of your community, that has improved its resource and currently the valleys tend to get more out with tourists, whereas before as growing areas were abandoned and damaged by wind and water, in addition to planting and grazing did not let the grass grow and the landscape so enjoyable as now. In addition to soil is more productive to tourism with previous activities.

The use of the valley for tourism has given more opportunities for everyone to have a job, and there is more public participation in economic activities. Land use for tourism purposes has been the best alternative to improve the living conditions of the population and the population has held out looking for work.

Soil types and their location has become agricultural areas and recreational spaces in areas with a rich landscape for tourism, establishing a number of tourist facilities such as restaurants, tennis ATVs, artificial lake and others. The population empirically and based on its experience has identified the valleys. The locations of these in some cases are suitable places, but not so in all cases. Since the establishment of the slopes in rocky and marshy areas.

#### Hydrology

The population has no water problems, care of the forest ensures that their springs provide all year. To this day the quality of this is good as we have stated, and their use has allowed them to improve the tourism service, since most food establishments have restrooms, although rudimentary way because the absence latrine drain served.

Another way in which tourism is encouraging is producing trout, as her food services are supplied.

The abundance of water has allowed them to expand the tourist offer with the creation of an artificial lake, giving the opportunity to more than 5 villagers engage in and benefit from tourism.

#### Forest

Previously the villagers of the community engaged in agriculture and livestock and valleys were part of these activities today are realizing the recreational tourist activities. The valleys were cleared to open spaces for agriculture to tourism generated commoners began to reforest and care of trees surrounding valleys.

The forest landscape improved its still enjoyable for visitors who later became tourists, the villagers know of the importance of the forest for tourism so they are in the care of trees that surround the valley. Try to maintain the scenic beauty of the place, although they know that much to regain the valleys as before. They are also aware of the importance of forests for climate regulation and water so that it is abundant and enable them to supply the neighboring municipalities cycle.

The Forest of the community of San Pedro Atlapulco accommodates resilience, ie, has the ability to high recovery by the volume of forest growth but has difficulties mentioned by farmers and fires but the community has solved these problems by request twenty caregivers forest fire.

Now are the valleys that give sustenance to rural families, not having to make use of wood from the forest, or having to deforestarlo and can thus retain and exploit its application either as a tourist attraction or environmental services.

### Social

Tourism is allowing families of the community of San Pedro Atlapulco improve their quality of life. For tourism revenues, the number of young migrants to other cities has been declining.

The community has also benefited from tourism revenue they get for paying car entries to the valleys that are for the common use of the community, and are used to build the infrastructure that is in need of the community as : the health center, elementary and secondary level, primary.

Many public services have also improved services such as electricity and potable water. The last three years have made drinking water service to tourist valleys of springs used before. Currently in one of the valleys already has water, electricity and public telephone.

The incorporation of tourism as an economic activity in the community of Atlapulco revived forms of communal organization of the economy of the peasants, which has given the opportunity for families to participate in activities primarily within the travel services from their own economic and according to his own conception of what the tourist service possibilities. The interesting thing is that the community today has been organized from bases around tourism manifesting a social and cultural change. The natural resource is no longer only in terms of agricultural production, but keep this as a tourist attraction capable of attracting tourist flows and thereby improve or maintain their incomes, which have enabled them to improve their living conditions.

From the organization of tourism program of conservation of natural resources of the forest and valleys through the community management was established. Everyone in the community should be involved in work activity, if you can not attend may send someone or pay someone to attend in your place. If not met, you may lose the opportunity to work in the valleys.

The rules governing communal life have been established by the community and tourism is now very clear to the community what is required to access the productive use of

communal resources in San Pedro Atlapulco that can be of two types: general and particular. The former refers to all the originating Atlapulco; these are bound to comply with the tasks to be established, and cooperation to participate in the community commissions determine in general meeting. The second refers to the productive use of resources and are only entitled to those with land rights. (Monterroso, 2003:16)

The expansion of tourism, and its demand has conceded that the majority population can be incorporated to work, even from an early age can do as part of the family, because they have the right to it.

Residents say that since tourism is an economic activity recognized by them, the participation of community members in general meetings held each month are busy, there are always issues to deal either to improve services, to see the distribution general revenues or to integrate new community members to the activity. In addition to tourism forms of involvement in managerial positions were extended and now almost all men in the community have to take a position in the valleys and do something for the community. So each year are elected representatives of the valleys. The work for development of the community has improved since this is honorable, not received any payment for their services.

The general public can participate in tourism are these older adults, youth, children and especially women. The work of all helping to advance business and find equity in the community and that all persons originating in the community can participate either directly or indirectly on tourism. .

One can say that there is equality because all Atlapulco born population has the right to exploit natural resources so everyone can work in tourism in the valleys of the community, provided upon request and are assigned their rights and he made known his obligations. Therefore, 80% of the economically active population is engaged in tourism, so everyone benefits from the forest and valleys d either through the provision of a service or resource that provides as wood, charcoal water, clean air. The conditions for joining a tourist service is in relation to their investment opportunities as they may participate in different orders as horse rentals, ATVs, sale of food or candy, and investment can be from 1,000.00 to 30,000.00 but the recovery of investment ranges from three months to one year depending on the rotation and quality (Zizumbo, 2004).

Women and children in the community are also working together in tourist valleys; most women and children working in restaurants and other services sold sweets, as in the quad and horse rentals.

The distribution of the economic benefits this community has unique characteristics in tourism. To evaluate a survey and interview community members and service providers in tourism valleys was performed. So was that today 80 percent of the community tourism are devoted, tourism is shifting agriculture now only grown for home consumption and feed the animals working in the valley on the weekends.

The natural resource management for tourism purposes has allowed the generation of economic growth in the communities from the emergence of new economic activities that were not typical of the rural communities, such as food and beverage service, rental ATV's,



horse rentals etc.. These new activities require to adequately meet other needs tourism as planting barley and oats to feed the horses, shops selling spare parts, planting of trout for marketing, allowing diversification of productive activities. (Zizumbo, 2004:66)

Productivity in providing tourism is reflected in tourism services has allowed the income generated will help improve the conditions of people as the construction of streets, sidewalks, street lighting, garbage collection and strengthen their community traditions as the festivities. Improving communities is made of the benefits generated from tourism.

As for their living may be said that in general, the population has income that can be placed as middle class because their homes are concrete, two stories, with facilities of water, electricity, telephone, drainage with television and in cases even cable. (Zizumbo, 2004:66)

It should be noted that the community sees tourism as a major economic source in the economy and tourism has given them the opportunity to connect with the modern world and are currently seeking to improve their living conditions, which is why looking at other supplement their income activities such as trade, educational services as teachers, medical services as nurses, secretaries and some goes to Mexico City to work.

The school population has increased to be at the basic level happened to be the average level, since most of the population finished high school. A significant percentage of students still studying outside the community either in Santiago Tianguistenco, Toluca or Mexico City, and is currently suing to establish high school.

With regard to food is considered to have improved as well as the basic feed corn, beans, beans, egg, and milk. They have now incorporated into their diet mainly meat and fish trout.

Working in tourism is a major attraction for young people since a very early age they can become involved supporting their parents in the activities they manage, this allows them busy and do not engage in vagrancy or crime.

The community involvement is equally distributed among the community because everyone is entitled to the exploitation of forest and valleys, but the benefits are not the same depending on the rotation, the valley in which they are working, the conditions that each investment and circumstances have to capture tourism in tourist services. So while some may have better income, others are limited.

There is in the community's vision of sustainability not neglecting their relationship with nature, which is the hub of its existence and that gives the possibilities of reproduction. They know that this propelling the sustainable programs, but without me having to say they always manage as part of their culture.

The adaptability of the community in new activities that allow them to improve their conditions, without having to leave their cultural base supported by the peasant economy in which social, cultural and religious values are maintained.

As for the tourists achieve personal development through recreation alternatively through the enjoyment of your stay at these places, expressing their values, tastes and preferences

through the activities. The valleys of its size and natural resources that has allowed visitors to meet the motivations offered by tourism in natural areas. It is considered that the tourist can voluntarily and pleasantly, and very confidently walk, play, and recreation without having to have large sums of money and therefore is an ideal place for the people of Mexico City and Toluca limited economic resources.

Currently there are few places that offer recreational activities, most will respond to the fun, however, forest and valleys San Pedro Atlapulco are an alternative for tourist recreation and that aim specific outdoor activities that provide pleasure outdoor recreation.

Ecotourism is an activity that is promoted in this valley, but without adequate knowledge, since it requires a social, cultural and environmental awareness is not quite understood by the inhabitants of the valley. Also a lot depends on the managers and how they only stay a year in charge is very brief period of their performance in the public service to develop actions that are institutionalized. However, social sensitivity, it has been important to incorporate the benefits of tourism to the community and that they, ultimately, the direct beneficiaries of the tourism experience and the care of those resources.

### Conclusions

The San Pedro Atlapulco's forest is an important resource for the community. The community members are taking advantage of forest, by tourism and the scenic beauty, clean air and proximity to Mexico City and the metropolitan area that attracts tourists.

The residents of San Pedro Atlapulco try to take care of their forest resources to maintain the water through the support provided by the state government of Mexico.

The recreational tourism activities being undertaken are not presented in a sustainable manner, even though it improved the economic situation of the people, the negative effects that are occurring in the long term have a greater impact in this area.

The soil of the tourism valleys are not suitable for some of the recreational activities that are taking place, however they have the opportunity to be exploited to carry out ecotouristic activities aimed primarily to take care of the environment and are of lower impact. In the analysis of the soil based on sustainability, the tourism valleys of the community have been damaged by activities such as horseback riding and ATV use, that cause the problem of compaction and erosion of the soil.

The natural characteristics of the community of San Pedro Atlapulco are suitable for the practice of ecotourism, but the villagers have not displayed for their benefit, since they only take advantage of the valleys for tourism and recreational activities in mass, leaving aside the presence of forest resources, currently untapped, it has not found a way to use it individually. However, the eco-tourist activity is an alternative that can result in local productive sectors in the community, proposing new activities through a community organization that could begin to plan for tourism in a collective manner, and on the other, preserving and exploiting the natural resources of forest.

The management of tourism in the community is promoting local development. The existence of natural resources like the forest that generates economic benefits for the people

who handle it directly, and environmental benefits for the entire society. Such economic benefit is almost entirely in the communities, since there are no costs to be paid abroad.

From the evaluation of forest sustainability through MESMIS methodology is that the forest resource is not being exploited in a sustainable way because the villagers are not using it commercially, in other words, the residents do not use the forest properly because they prefer to maintain the existing hydrological cycle, without interfering in the conservation although it is the resource that brings a lot of revenue for the community. The forest also provides a pleasant environment which has allowed tourism to grow in the community and has provided the community members with new opportunities to improve their living conditions and the equipments within the community.

The community should assess the development of tourism in order to protect their natural resources from the negative effects and find some alternatives for sustainable momentum, based on ecotourism as an alternative for the preservation of the environment and improve the economy and quality of life for residents.

In this sense, the community must: establish strict conservation of nature to protect flora, fauna and the ecosystem, to determine the limits of absorptive capacity so that there isn't an excess growth of tourist installations on the environment, construction small-scale facilities in appropriate environmental sites, with local design style, using local materials, energy saving system and proper disposal of waste, create a visitor center with visual information about the site and appropriate conservation techniques, develop and disseminate codes of ecotourism to the behavior of tourists and operators, as well as monitoring compliance with these codes, train villagers as guides that provide tourists with accurate information on biodiversity and conservation techniques, and practice good conservation measures during tours.

The conservation of natural resources of the forest and valleys are made through community management. All residents of the community have opportunities to use their resources for their survival, only that it is necessary to put consideration of the general assembly of villagers that regulates and authorizes the forms of use.

Tourism is playing an important role in the community among the community with the use of natural resources, economy and social organization. Since tourism is now the mainstream economy, the community is developing its environmental, social and economic. The villagers have jobs that help reduce migration of young people before they went to Mexico City to find work.

## References

- Barcena, Iñaki. II Ibarra, Pedro. III Subyaga, Mario (2000) Desarrollo Sostenible un concepto polémico – Bilbao Servicio Editorial. Universidad del País Vasco/ Euskal Herriko Unibersitatea
- César Dachary, A (2002) Globalización, Turismo y Sustentabilidad: Centro Universitario de la Costa, University of Guadalajara, México
- Colom, Antoni J. (2000) Desarrollo sostenible y educación para el desarrollo. Barcelona, España. 8<sup>th</sup> Edition
- Wanichanugorn, Wannaporn (1995). Ecoturism. Thailand: The weekend Nation Magazine
- Duerr, William A. et al. (1979), Forest Resorce Management; W:B Saunders Company
- De La Torre Padilla, Oscar (1994), El turismo fenómeno social. México: Fondo de cultural económica, Mexico
- Daltabuit D.,Magali et al.(2000), Ecoturismo y Desarrollo Sustentable: Impacto en comunidades rurales en la selva Maya, coauts Cuernavaca: UNAM, CRIM
- Enkerlin, Ernesto C. et al.(1997). Ciencia Ambiental y Desarrollo Sostenible. México. Internacional Thomson Editores.
- Hernández, Orozco, Joaquin (1983). Suelo y Ocio. Conceptos y Métodos en el ámbito de la recreación al aire libe. Española Editores
- Masera,O.R; M.Astier y S. López- Ridaura (1999)Sustentabilidad y manejo de los recursos naturales. El marco de la evaluación MESMIS. México: Mundi-Prensa
- Negreros C.,Patricia: et al. (1999). Sustentabilidad y sistemas campesinos. México: Mundi-Prensa
- Organización Mundial del Turismo (OMT) (1998). Introducción al Turismo. Madrid, España, Egraf
- Organización Mundial del Turismo (OMT) (1999), Guía para Aministraciones Locales: Desarrollo turístico sostenible. Madrid, España, Egraf
- Panayotou, Theodore (1994). Ecología, Medio ambiente y desarrollo: Debate crecimiento-versus conversación. México: Ediciones Gemika.
- Paz, Maria Fernanda (1995). Aspectos sociales de la deforestación en América Latina. Centro Regional de Investigación Multidisciplinarias: UNAM
- Rivera Sánchez, Liliana. : El discurso de la participación en las propuestas de desarrollo social en Sociedad Civil Vol. 7. Mexico DF.
- Rico, Carlos A. (1999). Especio Lúdico., El papel de la recreación en la construcción de lugares. Editorial Fundación Libre. Colombia
- Panayotou, Theodore (1994). Ecología, Medio ambiente y desarrollo: Debate crecimiento-versus conversación. México: Gemika Editores
- Shugurensky, Daniel (1989): El problema del desarrollo: Orealc Editores
- Smith, Stephen (1992): Geografia recreativa. México: Trillas Editores
- Sureda, Jaume Y CALVO, Ana M<sup>a</sup> (1998). Recursos documentales para la ambientalización de la formación profesional en turismo: Di 7 Editores
- Tamayo Y Tamayo, Mario (1994): El proceso de Investigación científica, México: Noriega Limusa

- Veltneyer, Henry y O'Malley, Anthony (2003). En contra del neoliberalismo. México: Purroa Editores
- Vera, Fernando et al.(1997). Análisis territorial del turismo: una nueva geografía del turismo. Barcelona, España: Editorial Ariel,S.A
- Veltneyer, henry y O'Malley, Anthony (2003). En contra del neoliberalismo. México: Purruá Editores
- Zamorano Casal, Francisco Manuel (2002).Turismo alternativo: Servicios turísticos diferenciados: animación, turismo de aventura, turismo cultural, Ecoturismo, recreativo. México: Trillas Editores
- Ziperovich, Andrés (2004) Turismo y recreación. México : Trillas Editores