

The actors in the ecosystemic management of the agricultural and tourist park of Chiclayo

Los actores de la gestión ecosistémica del parque turístico agropecuario de Chiclayo

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Abstract

The purpose of the research is to validate the participation of the actors in the ecosystem management of the Chiclayo Agricultural Tourist Park; which allows the territory to be organized and developed adaptively and sustainably. The objectives are: The evaluation and characterization of the Park's ecosystem; The identification of the variables of driving forces, pressures, state, impacts and responses of the Park's ecosystem; as well as the comprehensive modeling of the Park's ecosystem. The research method is the characterization of the Park in the natural physical, urban physical and demographic aspects. socio-economic and cultural; using the UNEP GEO Cities methodology (2008), the variables of Driving Forces, Pressures, State, Impacts and Responses The most important results demonstrate that the coordinated action of the actors of the Ecosystem Management of the Park has. A comprehensive approach with resilience and adaptability characteristics will promote the change from the state of conservation in Decline to the state of Reorganization with New Growth; Such a situation highlights the traditional agricultural and artisanal work of the population and guides the orderly and sustainable occupation of tourism and cultural activities.

Keywords: Leadership and adaptability of ecosystem management of the Chiclayo Agricultural Tourist Park.

Resumen

El propósito de la investigación es validar la participación de los actores de la gestión ecosistémica del Parque Turístico Agropecuario de Chiclayo; que permita ordenar el territorio y desarrollarlo adaptativa y sosteniblemente. Los objetivos son: La evaluación y caracterización del ecosistema del Parque; La identificación de las variables de fuerzas motrices, presiones, estado, impactos y respuestas del ecosistema del Parque; así como la modelación integral del ecosistémica del Parque. El método de la investigación es la caracterización del Parque en los aspectos físico natural, físico urbano y demográfico y socio económico y cultural; empleándose de la metodología GEO Ciudades de PNUMA (2008), las variables de Fuerzas Motrices, Presiones, Estado, Impactos y Respuestas. Los resultados más importantes demuestran que la acción coordinada de los actores de la Gestión Ecosistémica del Parque tenga un enfoque integral con características resiliencia y adaptabilidad, propiciara el cambio del estado de conservación en Decaimiento al estado de Reorganización con Nuevo Crecimiento; tal situación pone en valor las tradicionales labores agropecuarias y artesanales de la población y orienta la ocupación ordenada y sostenible del turismo y actividades culturales.

Palabras clave: Actores y adaptabilidad de la gestión ecosistémica del Parque Turístico Agropecuario de Chiclayo.

INTRODUCTION

The Agricultural and Tourist Park of Chiclayo is an intervention strategy of Rural Community Tourism, which articulates the traditional agricultural and cultural activities of the population with tourism and recreational activities in an orderly and sustainable manner. The participation of the population is of vital importance; the key actors are organized with the objective of achieving sustainable benefits.

The lower basin of the Reque River, occupied by the Mochicas and Chimús, the tenure of land property and the effects of the El Niño event make the tenure of agricultural property complex and eventual.

The purpose of the park is to consolidate the traditional agricultural and artisanal activities of the population of the lower Reque River basin. This ecosystem is threatened by agribusiness and urban growth in the Chiclayo metropolis. They put pressure on the ecosystem with changes in urban land use and environmental impacts.

In this sense, the research question will be: How will the ecosystemic management of the Park allow the consolidation of orderly and sustainable traditions of the recreational and cultural tourist activity?

The main objective is to validate the holistic model for the ecosystemic management of the Park, which will allow territorial planning and an adaptive and sustainable development. The specific objectives are: To evaluate the ecosystem characterization of the proposed area of the Chiclayo Agricultural Tourist Park. In addition, to identify the variables of driving forces, pressure, state, impacts and responses of the Park, as well as to holistically model the ecosystemic management of the Park.

The leadership of the actors in the ecosystemic management of the Agricultural and Tourist Park of Chiclayo is especially important because of the initiative they propose in the traditional, agricultural and livestock activities and handicrafts of the districts of Monsefú, Reque and Eten, and because of the potential for tourism, recreation and cultural activities in their territory, determined by the scenic and landscape richness of the natural environment

of their surroundings. Likewise, the population centers of the districts of Monsefú, Reque, and Eten are home to a population that has a great adaptive capacity, which preserves an ethnic and cultural idiosyncrasy inherited from the pre-Hispanic cultures of Lambayeque.

METHODOLOGY

The research will be basic and the object of study will be the ecosystemic management of the Agricultural and Tourist Park of the Metropolitan Area of Chiclayo. The variables of the GEO Cities methodology of UNEP (2008) will be used for the elaboration of urban-environmental diagnoses of Latin American cities. The action of urban growth on the Park's Ecosystem is analyzed from the perspective of sustainability through the matrix Driving Forces-Pressure-State-Impact-Response; the impact on biodiversity is analyzed with a transect study to estimate the Alpha and Beta Biodiversity.

The population that will be involved in the research are all the individuals of the ecosystem of the Agricultural Tourist Park that includes 15 rural population centers and 3 urban centers of Monsefú, Reque and Eten. The sample will be taken from individuals of the ecosystem of the Cusupe population center in Monsefú.

The materials used are: National Chart of Chiclayo, Plans of the city of Chiclayo, Aerial and horizontal photographs, SOFT WARE: Google Earth Pro, Stella10.0.6, NVIVO. The instruments used are: Mazda CX5 Mobile Unit, Samsung Camera, Garmin Nuvi 260 W GPS, Toshiba Satellite Computer Equipment, Personal Protective Equipment, Drone. The methods used are: Field Observation, Personal Interview, Documentation Review, Chiclayo Development Plans, Urban Studies, Technical-Environmental Studies, Surveys, Polls. The primary sources used are: Population Surveys, Field Observations and Sampling, Provincial Government of Chiclayo, District Governments, MINCETUR, MINAM, MVCS, INDECI, INEI, UNPRG, USS, SENAMHI, ANA, INDECI Disaster Prevention Plans, GEO Chiclayo Report, UNEP. The secondary sources are: Chiclayo Environmental Urban Development Plan, Methodology for the Preparation of GEO

Cities Reports, National Urban Development Plan of Peru. MVCS, Regulations on Territorial Planning and Urban Development MVCS, Regional Environmental Policy. CAR-CONAM, Technical-Environmental Study of Air in Chiclayo, CONAM, Technical-Environmental Study of Water in Chiclayo, CONAM.

A holistic model of the Ecosystemic Management of the Agricultural Tourist Park of Chiclayo will be built, in which the biodiversity situation will be evaluated with the analysis of Transects in the area of the Park. In addition, NVIVO will be used to analyze social perception surveys among the leaders of the Park.

RESULTS

Dimensions of Driving Forces

Eight driving force indicators have been selected, 3 in the social and cultural aspect: settlement of farmers and ranchers; relationship of activities with Chiclayo's cultures; property tenure and social organizations; 2 in the urban natural physical aspect: The effects of the El Niño event; the properties and activities have a character of possession and eventual use; and 3 in the economic aspect: The market for agricultural products; agro-industrial products and bread products. The market for agricultural products strongly determines the park's ecosystem management. The criteria for this determination is the strongest relationship of these indicators in the ecosystem management of the park. See Table 1.

Table 1.
Dimensions of Driving Forces

Aspects	Indicators of the dimension
Social and cultural aspect	The population of the sector was consolidated as farmers and ranchers who maintained family groups from generation to generation and who suffer a constant process of subdivision.
	Socio-cultural activities are related to the Mochica Chimú Agrarian culture: with nature: air and biodiversity of the valley; with the Tiahuanaco, Wari and Chavín cultures; with the maritime culture of Lambayeque; with the religious culture of Hispanic Catholicism.
	Land tenure and social organizations are a product of the culture of the ecosystem's population, which is one of the main driving forces that condition the use of the basin.
Natural and urban physical appearance	The effects of the El Niño event have had a significant impact on the territory of the Chiclayo Agricultural and Tourist Park.
	The land ownership, agricultural and livestock activities, and the infrastructure of the Agricultural and Tourist Park have the character of possession and eventual use due to the changing dynamics of the Reque riverbed.
Economic aspect	In the agricultural products market of the Park, sugar cane and rice products predominate as agro-industrial products; as bread products, fruit and others.
	Sugarcane, rice, cotton, and corn are marketed by the valley's agro-industrial companies; bread, fruit, and alfalfa products are marketed through the supply markets in the Chiclayo metropolitan area.
	The characteristics of the market for agricultural products determine the economic dynamics of the population of the Reque river basin ecosystem.

Dimensions of Pressure

Seven pressure indicators have been selected, 3 in the social and cultural aspect: urban population growth; population of the populated centers; emissions and discharges of the population; and 4 in the natural urban physical aspect: change from non-urban to urban land use; low

consumption of drinking water in major urban centers; solid waste disposal in the pampas of Eten, urban edges and slopes of roads, ditches and drains; and reduction of vegetation cover. The criteria for determining these pressures are the greatest significance in the Park's ecosystem management. See Table 2.

Table 2.

Social and cultural aspects

Aspects	Indicators of the dimension
Social and cultural aspects	In terms of population growth, we can appreciate the positive dynamics of the districts of Monsefú, 0.7% and Reque, 2.1%, and the negative dynamics of the district of Eten, -0.1%, caused by the isolation generated by the El Niño event of 1982.
	The current population of the Park is 46,584 inhabitants. In Monsefú, there are 10 rural population centers and the main urban center with 25,302 inhabitants. In Reque, the main urban center with 10,711 inhabitants. And in Eten, 2 rural population centers and the main urban center with 10,571 inhabitants.
	The population dynamics put pressure on the park's natural ecosystem through land occupation and the generation of friction, emissions and discharges from the socioeconomic and cultural activities of the population.
Natural and urban, physical appearance	In the change from non-urban to urban land, we can see that in the last 34 years, the Park has lost 159.86 hectares of natural parkland, with an average of 4.70 hectares per year.
	Per capita water consumption shows significant deficits in the urban areas of the three districts. Eten is receiving an average of 19.2 Li/per/day; Monsefu, an average of 19.53 Li/per/day; and Reque, an average of 16.05 Li/per/day.
	Informal solid waste disposal occurs partially in the pampas of Eten, and the rest on the perimeters of urban centers, on roadsides and in ditches and drainage ditches.
	The reduction of vegetation cover is due to the recent process of urbanization of the main urban centers; the increase of 4.7 hectares/year puts pressure on the natural environment of 866.10 hectares, so it is necessary to control this growth.

Dimensions of Status

Six status indicators have been selected, all six in the urban natural physical aspect: occupation of geologically unstable areas; deterioration of the waters of the Reque River due to sewage disposal; decrease in air quality due to garbage

burning; contaminated sites due to solid waste disposal; natural vegetation cover in the wetlands surrounding the river; deterioration of archeological zones in the Park. The criteria for determining these status indicators are the most significant in the Park's ecosystem management. See Table 3.

Table 3.
Dimensions of status

Aspects	Indicators of the dimension
Natural and urban, physical appearance	The occupation of geologically unstable areas due to the danger of flooding in the areas adjacent to the Reque River, characterized by agricultural land, natural conservation areas and desert, with 545 hectares, representing 16% of the total area of the zone under study.
	Deterioration of the water and soil resources of the Reque River with pathogenic microorganisms that registered thermotolerant coliforms (22 CFU/100). Due to the evacuation of domestic wastewater, as a result of inadequate treatment of the stabilization ponds.
	Decrease in air quality due to the burning of domestic and agricultural waste from the area's residents.
	Environmental contamination caused by the disposal of solid waste is found on the perimeters of urban centers, on the sides of roads, and in ditches and drainage ditches.
	Covered with natural vegetation in natural areas with high bio-ecological value, where abundant flora and fauna resources can be found.
	Deterioration of Huaca El Taco and Huaca Miraflores archeological sites due to lack of enhancement.

Dimensions of impact

Four impact indicators have been selected, two in the social and cultural aspect: the incidence of diseases due to intoxication and contamination; the expenses incurred by the population to cure water-related diseases; and two in the natural-

urban physical aspect: loss of biodiversity due to the reduction of the natural area; risk to the population due to its location in vulnerable areas. The criteria for determining these impacts are the most significant in the Park's ecosystem management. See Table 4.

Table 4.
Dimensions of impact

Aspects	Indicators of the dimension
Natural and urban, physical appearance	The incidence of diseases due to intoxication and contamination from water resources in the Park, where the highest incidence rate is Eten with 363.04 x 10,000 inhabitants, which is related to the scarce supply of drinking water that its population has 19.2 lt/person/day.
	The expenditure made by the population to cure diseases caused by water resources is significant; in Monsefu they spend s/. 316,000.00/year in Eten with s/. 192,000.00/year and in Reque with s/. 57,000.00/year.
	The loss of biodiversity in the Park is due to the processes of agricultural habitation with an extension of 2,120.42 hectares and the growing urban area that has an extension of 394.22 hectares with a growth indicator of 4.7 hectares/year; which produces a significant impact accelerating the process of loss of the natural area of 866.10 hectares and its biodiversity.
	Risk to the resident population in areas vulnerable to flooding from the Reque River occurs in Cascajales, Villa del Milagro and north of Eten.

Dimensions of response

Nine response indicators have been selected, 3 in the social and cultural aspect: inclusion of environmental and land use planning issues in school education; manifestation of the Passion of Christ in Reque; the FEXTICUM fair in Monsefú, RECSI Fair in Reque and Niño del Milagro Fair in Eten; 4 in the urban natural physical aspect: Environmental education workshops to face

the El Niño event; construction of riverside defenses on the Reque river; solid waste recycling centers; construction of tubular water wells; 1 in the economic aspect: productive knowledge workshops and 1 in the political-administrative aspect: Elaboration of territorial planning documents. The criteria to determine these answers is the greater significance in the ecosystemic management of the park. See Table 5.

Table 5.
Dimensions of response

Aspects	Indicators of the dimension
Social and cultural aspect	Inclusion of the environmental education guide and land use planning in Regular Basic Education and in the regional curriculum- GRL 2022. Staging of the Passion of Christ during Easter Week in Reque
Political and administrative aspects	Workshops in environmental education SERNANP, workshop to face the phenomenon of El Niño - Eten. Participatory workshop on wetlands of Eten and its current situation. Construction of riverside defense on the southern bank of the Reque River in the district of Eten. Recycling center of the NGO “Compromiso con las Mujeres de Eten” and recycling center “El Cerrillo” in Reque. Productive knowledge workshops. Urban development plans, CDP, disaster prevention plans for Reque, Monsefu and Eten, and the Eten wetlands management plan.

Holistic modeling of the ecosystemic management of the Park

Its main objective will be to reaffirm the traditional agricultural and livestock activities and crafts of the inhabitants of the districts of Monsefu, Reque and Eten and to strengthen these activities with recreational and cultural tourism activities. To this end, the territory will be organized around the Agricultural Tourist Park, until reaching the Metropolitan Ecological Park of the Wetlands of Eten, where these activities are harmoniously articulated integrally by a complex network of existing roads between the rural properties of the three districts. The main scene is the Reque riverbed, which will have an ecological corridor and seawall treatment on both banks of the sector.

A description of the Park’s Ecosystem Management is provided. See Figure 1

Figure 1.
Proposal for the Agricultural and Livestock Tourist Park of the Chiclayo Metropolitan Area



Nota: Estudio de Ordenamiento Territorial de la Cuenca Del Rio Reque. Sector 04

Analysis of the Social Perception of the Ecosystemic Management of the Park

The NVIVO application was used to systematize the analysis of the interviews with agricultural leaders. The degree of acceptance of the Park was measured.

The recurring topics of the analysis are: the areas of the Reque River, environmental education, waste, Eten's wetlands, citizen participation, water and the districts of the Park.

In summary, it can be seen that the population agrees with the park project and is willing to maintain their properties and their agricultural and cultural activities and preserve their natural environment.

DISCUSSION

Dimensions of Driving Forces

The Park's population is a direct heir of the Mochica, Chimú and Sicán cultures that settled before the arrival of the Inca and Spanish domination in this valley of Chancay, Lambayeque. The culture inherited by the population of the districts of Monsefú, Reque and Eten; of the Park; is a culture based on agricultural activity; Similar situation describes Toure (2016) in his thesis "Ecosystem approach to the territory...". Property tenure is the result of complex processes of relocation of the original population of the middle valley population centers, which occurred at the time of the arrival of the Spaniards, where many of the valley's natural settlers lost their property when they were transferred to new population centers in the lower valley such as Monsefú, Reque and Eten.

The El Niño phenomenon is another important driving force; it is manifested by the increase in temperature of the equatorial Pacific Ocean, which contributes to significant changes in the continent's climate. The effects of El Niño have a significant impact on the park's territory. Land ownership, traditional agricultural and cultural activities, and the environment of the Reque River have a contingent character due to the changing dynamics of the Reque River.

Dimensions of Pressure

Population growth is one of the most important pressures; there is positive growth in Monsefú (0.7%) and Reque (2.1%) and less dynamic growth in Eten. The population growth puts pressure on the Park's natural area through land occupation and the generation of friction, emissions, and discharges from the population's social and economic activities.

Land change from non-urban to urban is another important pressure; in this indicator we can appreciate that in the last 34 years, from 1981 to 2015, the Park area had a loss of 159.86 hectares of natural area, at a rate of 4.70 hectares per year.

The reduction of the park's vegetative cover is another important indicator. The 2,120 ha of agricultural crops and 394 ha of urban areas in the park's districts have caused this reduction. The reduction of vegetation cover is currently occurring due to the incipient urbanization process. The increase in urban area by 4.7 ha per year puts pressure on vegetation cover.

Dimensions of Status

Another important indicator is the occupation of geologically unstable areas in the Park due to the risk of flooding; 545 hectares are occupied by agricultural land, natural conservation areas, and desert areas.

Another indicator is the quality of the water supply, which in this case is acceptable, because in the urban area of the park, the drinking water supply is mostly public, provided by EPSEL S.A. Treated wastewater is of poor quality. As a result, there is deterioration of the water resource due to inadequate treatment of domestic wastewater.

Contaminated sites, resulting from the final disposal of garbage on the perimeters of urban centers, on the slopes of roads and ditches and drainage ditches.

Torregroza (2016), coincidentally indicates inadequate human behavior towards natural resources and the environment, which affects the basin and which results in the loss of fauna and flora; due to the cutting of wetland trees and the need for urban land.

Dimensiones de Impacto

Quality of Life and Human Health, measured by the incidence of diseases due to intoxication and contamination from water resources in the park, shows that the incidence rate of ADDs is the highest in Eten with 363.04 x 10,000 inhabitants, related to the scarce supply of drinking water in the urban population, 19.2 lt/person/day; in Reque it is lower with 74.40 x 10,000 inhabitants and Monsefú with 195.73 x 10,000 inhabitants.

Environmental impacts on the built environment are caused by settlers who have extended their possession over rural areas with the support of the local administration to obtain basic services, without taking precautions against the flooding threats of the El Niño event.

Ecosystems, natural environment, and biodiversity loss in the Park are the result of agricultural expansion and new urban development. The agricultural area of the park has an area of 2,120 hectares. However, the process of developing new agricultural land has been halted. The urban area of the Park covers 394 hectares, with a growth of 4.7 hectares/year, which has a severe impact, accelerating the process of loss of the natural area and its biodiversity. It is currently 866 hectares. Coincident to what Torregroza (2016) describes.

Dimensions of Response

The inclusion of environmental issues in the school education curriculum, such as the Environmental Education Guide for School Education, which was presented in Lambayeque, aimed at school students at the pre-school, elementary and high school levels.

The inclusion of the topic of land use planning in the regional curriculum, such as the "Methodological guide for the inclusion of land use planning" approved in the regional curriculum of school education in Lambayeque, to be applied in high schools.

Cultural events: FEXTICUM, Monsefú; RECKSI Fair, Reque; Festivity of the Divino Niño del Milagro, Eten; and the Staging of the Passion and Crucifixion of Jesus Christ, Reque.

Other responses include: Environmental Education Workshops; The construction of dams in the river; The recycling centers; Eten wetlands cleaning days; The organization of Workshops

on productive knowledge; The development of administrative policy instruments; and The Burning of Garbage; The Use of garbage dumps as negative responses.

Holistic Modeling of the Park's Ecosystem Management

Toure (2016) concluded that the greatest impacts are man-made, rather than climate effects. And that the ecosystem approach should have a territorial and multidisciplinary character. Rodrigues et al. (2007) focus on the importance of the ecosystemic management in all metropolitan areas, the improvement of population quality of life and its contribution with the world's environmental services.

Accordingly, the Park's Holistic Ecosystem Management Model will have as its central objective to reaffirm the agricultural and cultural traditions of its population and to articulate these activities with tourism, recreation and culture.

The territory will be organized around the Park and the wetlands of the Reque River, where these activities are harmoniously articulated by a complete network of existing rural roads between the properties. The main scenario is the Reque River accompanied by an ecological corridor with boardwalk treatments on both banks of the river.

It includes the small agricultural properties of the sector's inhabitants both on the north side of Monsefú and the south side of Eten and Reque; hotel investment zones will be promoted; agricultural and livestock activity with experiential tourism; a network of rural roads, plazas and craft trade points, viewpoints, boardwalks, and tourist restaurants. It coincides with Zazo (2010) in the proposal for the Parque Agrícola del Sur de Milán (Agricultural Park of Southern Milan).

The holistic management of the Agricultural Tourist Park of Chiclayo, should be a constant work oriented to give a balance in the ecosystemic relations of its territory. This coincides with Campos (2018) who mentions to us the interest of strengthening democratic-political processes, equity in the use of water and environmental sustainability in the Chancay River basin, Lambayeque.

Vianney (2018) recommends taking into account the territorial approach to implement public

policies at different levels of government, in turn, strengthening the farmer-territory relationship to conserve ecological processes and motivate the sustainability of the territory.

Perception of the Population

In the analysis of the social perception of the Park's ecosystem management, with representative actors of the Cusupe sector in Monsefú: Francisco Ballena Garnique, Felipe Ñañez Lluen and Daniela Ayasta Sipiran; on the Park's project and the dimensions of driving forces, pressure, status, impact and responses of the Park's ecosystem management. NVIVO was used to systematize the analysis of this perception. From this analysis it can be seen that the representative actors are in agreement with the Chiclayo Agricultural Tourism Park project, willing to conserve their land, their agricultural and cultural activities and conserve their environment in accordance with local government activities to provide them with better services and opportunities for entrepreneurship to offer tourism their ancestral cultural expressions.

The Actors of the Ecosystemic Management

The ecosystemic management of the Park is given by the participation of a diversity of institutions of society, public, private and communal, that interact in the area. Coinciding with Campos (2018) who indicates how the participation of stakeholders in water management in the Reque River basin is manifested.

The National Water Authority; the Local Water Authority; the Water Users Board; the farmers, ranchers, and artisans associations; and the neighborhood councils of the towns, religious, cultural, and recreational associations are the main stakeholders in the park's ecosystem management.

They play a major role in the conservation of ancestral customs and traditions of the population of Monsefú, Eten and Reque. And therefore, in the transmission of these customs and manifestations to tourism at all levels. These associations should be integrated into a Coordination Organization to improve the coordination of the Park's ecosystem activities.

García (2019) indicates that scientific activity consists of progressively developing habits that respond effectively to the problems of humanity.

According to Holling, Resilience is the capacity of a system to assimilate and learn from the perturbations to which it is subjected, managing to overcome them without substantial changes in its structure and function. García (2019) defines the Adaptive Cycle as a socio-ecological system that undergoes adaptive cycles of change operating at different spatio-temporal scales, which constitutes a panarchy.

According to García (2019), the state of the adaptive cycle in the Park's ecosystem is Conservation in Decline, because despite the conservation of agricultural and cultural activities and the persistence of its ecological richness, there are economic pressures in the market, which cause its decline, in addition to the strong pressures to urbanize land and develop agro-industrial activities in the Park.

Coinciding with Vianney (2018), the planning processes of the different territorial levels of the area guarantee the development of the ecosystemic management of the Park.

- The Concerted Regional Development Plan,
- Lambayeque's Ecological Economic Zoning
- Chiclayo Metropolitan Development Plan,
- Chiclayo's Territorial Development Plan.
- The Monsefú District Management Plan.
- Reque District Development Plan,
- Hazard Study of the City of Eten 2003.

CONCLUSIONS

1. The park's inhabitants have consolidated themselves as farmers and cattle ranchers on family-owned land, with an average of less than 1 hectare. They demonstrate a great capacity for adaptation and resilience to the conditions of their ecosystem.
2. The effects of the El Niño event determine the form of property ownership, agricultural and livestock activity and infrastructure interventions in the Reque River environment, giving it a character of eventual use, taking special care with the river's ecological activity.

3. The population of the main rural centers and the urban centers of the park's districts is 46,584 inhabitants, who put pressure on the ecosystem by generating pollution through friction, emissions and discharges.
4. Water consumption for human consumption in urban areas is scarce since the distribution service is provided 6 to 8 hours a day. In rural areas, consumption has improved in recent years to 15 hours per day.
5. Garbage is partly disposed of in dumps in Monsefú, the pampas of Eten and Reque, and the rest on the perimeters of urban centers, on roadsides and in ditches and drainage ditches, producing contaminated sites.
6. The loss of biodiversity and the alteration of flora and fauna ecosystems due to the reduction of vegetation cover in the Park is caused by the processes of agricultural and urban development. In spite of this, the Park's rich biodiversity is maintained.
7. The population's expenditure for EDAS is significant and related to the shortages in per capita water consumption.
8. Flood prevention expenditures are being made in the Reque riverbed, between Cusupe in Monsefú and Cascajales in Eten, with the construction of dikes in the most unstable areas of the riverbed.
9. The response of the education sector in the Park was the Environmental Education Guide and the "Methodological Guide for land use planning" aimed at school students at the kindergarten, elementary and high school levels in the Lambayeque region.
10. The response in terms of cultural activities is the organization of the traditional and religious fairs FEXTICUM, RECSY, Feria del Niño del Milagro and La Pasión de Cristo de Reque.
11. The waste treatment response is the organization of dumps in Villa El Milagro, Poémape and Reque; and recycling centers in Eten and Reque.
12. The territorial planning in the Park will contemplate the consolidation of the traditional agricultural and cultural activities; articulating the recreational tourism activities and ecological conservation. With the main scene of the Reque River and its changing dynamics produced by the effects of the El Niño phenomenon.
- 13 The perception of the population is that they agree with the Park's project; they are willing to preserve their land and their agricultural and cultural activities and preserve their environment in accordance with local government activities to provide them with better services and opportunities for businesses that offer tourism their ancestral cultural expressions.
14. There are 20 main stakeholders involved in ecosystem management in the Park, of which 8 are private organizations and 12 are public organizations.
- 15 The actors in the ecosystem management field carry out their activities in a disjointed, intuitive and chaotic manner, motivated by individual leadership, without strategic planning and without coordination to articulate their activities in an organic and sustainable manner.
16. The park's adaptive cycle is in a state of Conservation in Decline, despite the conservation of agricultural and cultural activities and its ecological richness, due to strong economic pressures in the agricultural and urban markets.

In synthesis, the model will allow the reaffirmation of the Ecosystemic Management of the Agricultural and Livestock Tourist Park of Chiclayo; so that it has a holistic approach and characteristics of resilience and adaptability, change from the state of Conservation in Decline to the state of Reorganization in New Growth; putting in value the traditional agricultural and cultural activities of the population, articulating the orderly and sustainable occupation with the tourist and cultural activity.

Authors' contribution:

Edgardo Pedro Rodolfo Arbulu Chereque: Theoretical elements, analysis, methodology, resources, initial and final writing.

Julissa del Rocío Gamarra Gonzáles: Theoretical elements, analysis, methodology, resources, initial and final writing.

Marianella Rosa Terry Ramos: Theoretical elements, analysis, methodology, resources, initial and final writing.

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