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Multi-criteria evaluation of the resources and tourist attractions of the area adjacent to the Zapotepamba Binational Technical Training Center

Evaluación multicriterio de los recursos y atractivos turísticos de la zona adyacente al Centro Binacional de Formación Técnica Zapotepamba

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Abstract

This research it seeks the sustainable development of the Zapotepamba Binational Technical Training Center (CBFTZ), through comprehensive landscape management. The methodology applied to collect information was through a quantitative and qualitative approach. With this, a situational diagnosis of the adjacent parishes was made; likewise, an inventory of resources and tourist statistics; finally, the multi-criteria evaluation. Once the assessment was carried out, it was identified that in terms of natural and cultural interest, the resources with the greatest tourist potential are found in the Catacocha Parish.

Key words: Tourist potential, multi-criteria assessment, tourist resources, Zapotepamba.

Resumen

La presente investigación busca el desarrollo sostenible del Centro Binacional de Formación Técnica Zapotepamba (CBFTZ) a través del manejo integral del paisaje. La metodología que se aplicó para el levantamiento de la información fue a través de un enfoque cuantitativo y cualitativo. Con ello se hizo un diagnóstico situacional de las parroquias adyacentes; además de un inventario de recursos y atractivos turísticos; por último, la evaluación multicriterio. Una vez realizada la valoración se identificó que en términos de interés natural y cultural los recursos con mayor potencial turístico se encuentran en la parroquia Catacocha.

Palabras clave: potencial turístico, valoración multicriterio, recursos turísticos, Zapotepamba.

Introduction

According to Zuluaga (2006) "Tourism is a mass social phenomenon, which has become for some countries an important and basic factor for their economy" (p. 77). But it is important to manage processes that lead us to adequate planning and proper use of tourist attractions and resources in a sustainable way. On the other hand, it is important to know the tourist development capacity of a territory because it is "directly related to the will of the actors to establish relationships between them, jointly and coordinately involved in improving the conditions of the territory to assume the challenges derived from these processes" (Merinero & Pulido, 2009, p. 174). According to Varisco (2008), the tourist development of a place can be defined as the improvement of services and facilities to satisfy the tourist's needs, as well as the effects such as the generation of employment and therefore the income from tourist activities.

On the other hand, when talking about tourism, it is talking about tourism planning, since it is important to take into account the tools and techniques that help us evaluate and prioritize the resources of a territory to give it potential value. Therefore, for the development of many investigations, multi-criteria evaluations have been taken as a tool, which are a set of instruments that allow evaluating different alternatives in order to arrive at concrete decisions. "This methodology has been widely used in socio-environmental studies, in natural risk assessment and in determining the ideal location for service facilities (among others, those that are linked to the incorporation of services in education)" (Joo & Alvarado, 2013, p. 144). In this research, this methodology will be applied to evaluate the potential of the tourist attractions and resources.

The study area includes Canton Paltas, the same that is one of the cantons of Loja province, which is located in the Inter-Andean Alley of the Ecuadorian Sierra, west of the city of Loja. Paltas, like most cantons, is an agricultural, livestock and commercial producer, which has a great variety of flora, fauna and a wealth of its cultural and natural heritage. It bears this name due to the presence of the pre-Inca Palta ethnic group, which constitutes the fundamental element of ethnography and provincial history.

Through a previous survey, it was quickly identified that Canton Paltas has a wide variety of natural and cultural tourism resources, but lacks tourism promotion and the lack of interest in them generates a limited supply and, therefore, low demand. Another disadvantage found is the lack of proposals for tourism projects; for this reason, it can be formulated as a research question. How does the absence of a multi-criteria evaluation affect the use of the tourist resources of Canton Paltas? Thus, this research aims to make an assessment of the tourism potential of the natural and cultural resources of Canton Paltas, which will later help future research.

The application of the multi-criteria evaluation allowed us to know that in terms of the natural and cultural interest with the greatest tourist potential that Canton Paltas has, it is the Binational Technical Training Center Zapotepamba, since it has all the necessary accesses, adequate infrastructure, basic services and programs or agricultural activities, which tourists can enjoy.

Multi-criteria decision techniques are a rational and objective instrument both to improve the understanding of the decision processes that underlie systemic processes, and to help decision-making centers to address the necessary comparison between alternatives (Cabello, 2017).

According to Chakhar (2003) (quoted in Ramírez, 2007):

> all MCE (Multi-criteria Evaluation) techniques consist of a first stage, of the design of a matrix with the defined criteria and alternatives; the next stage consists in the aggregation of the different scores of the criteria, with the use of a specific aggregation procedure (the application of some MCE technique), taking into account the preference of the decision makers expressed in terms of weights assigned to the different criteria; that procedure or technique allows the decision maker to compare between the different alternatives based on the assigned weights. (p. 36)

According to Franco-Maass et al. (2009):

> The use of this multi-criteria evaluation methodology in the tourism field is little applied, and according to the document reviews it can be affirmed that it has a greater diffusion in terms of evaluating environmental problems, health, territory, among others. Thus, its greatest acceptance is in the Geographic Information System (GIS for its acronym in Spanish. (p. 214)

Below there are some reviews of studies that have addressed topics similar to the purpose of this work. A review classified by country is developed.

Among the multiple works of this type, it is possible to mention the one presented by Franco-Maass et al. (2009) in Nevado de Toluca National Park-Mexico, it was decided to carry out a complete evaluation procedure, elaborating in the first instantiate the inventory and based on the information obtained in the field. Secondly, the intrinsic and extrinsic criteria were defined for each type of resource and a set of analysis attributes was constructed and the decision matrix was prepared. The application of the weighted linear combination led to the final ranking of the resources and the identification of those that had tourism potential. The results obtained reveal that La Peñuela and the crater of the extinct volcano contain the highest rated resources, determined by the weight of the intrinsic attributes.

In Mexico, Arciniega, Osorio & Regil (2016) they carried out a study to evaluate the tourist resources of the municipality of San Pedro Lagunillas in the State of Nayarit, so they applied the multi-criteria evaluation (MCE) methodology since it is precise for these types of studies, it was carried out in phases in this way; the first one made an inventory of the resources that the parish had; subsequently, with the attributes matrix, the evaluation was carried out in order to propose a tourist product based on the resource with the greatest potential. The resource that obtained the best score was the Luis Donaldo Colosio Ecological Park.

Then, another work explores the inventory of attractions by applying the multi-criteria evaluation methodology (MCE) with a focus on a tourist product, from the Sierra de Nanchititla State Park, State of Mexico, for this purpose, a research was carried out to collect information from the field of hierarchical tourist attractions; subsequently, the multi-criteria evaluation methodology was applied, allowing the identification of the resources that stand out over which work must be done to develop tourist products that generate sustainable economic alternatives (Enríquez et al., 2010).

Continuing with the studies, Vanegas et al. (2017) with their research called: Multi-criteria evaluation and inventory of tourist attractions, Case study, at first an inventory of attractions was carried out, using the multi-criteria of decisions method based on the required inputs to design the proposal for a tourist promotion route for the municipality of Itagui. A decomposition of complex structures into their simplest components was made to obtain an assessment of attributes of tourist destinations, both qualitative and quantitative; which were hierarchically ordered to establish logical processes in decision making. From the work carried out, it is corroborated how the evaluation and inventory of tourist resources becomes a relevant tool to direct the planning and tourism development processes of the regions.

In summary, the review of studies from different countries shows that there are many investigations that are based on determining the tourism potential of each region in

order to, through the results, propose a tourism product that helps the development of tourism in the area, for which, an inventory of tourist attractions, field work, interviews, data collection had to be carried out; likewise, the multi-criteria evaluation methodology (MCE) was used, which is based on the intrinsic and extrinsic components. It is worth mentioning that all the aforementioned studies are related to this research and which will be used to base and guide.

Materials and Methods

The methodology used was a quantitative and qualitative approach. With this, a situational diagnosis of Canton Paltas was made; likewise, an inventory of tourist resources and attractions and finally the multi-criteria evaluation following the stages it has.

For the development of this research, a bibliographic review of all the tourist attractions of the Canton Paltas was first carried out, in books and in the Ministry of Tourism; as well as general data of the canton. In the same way, a bibliographic review of articles related to multi-criteria evaluation was carried out in order to base the theory on the results found in this research.

For the inventory of the resources and tourist attractions of Canton Paltas, the methodology of the Ministry of Tourism of Ecuador 2018 was used. With this it was possible to demonstrate that there are 27 tourist attractions of which 14 are cultural and 13 natural.

Based on the Multi-criteria Evaluation methodology described above, an evaluation procedure was carried out that included the following stages:

Once the set of alternatives has been defined, the next step to follow is to establish the set of extinct and intrinsic criteria to be used to evaluate tourist resources and attractions. The intrinsic allow the specific characteristics of each resource to be analyzed according to their nature, such as the visual elements linked to the space (vegetation, extension and transparency of water); terrain characteristics (grade, type of surface and degree of difficulty); additional dimensions and attractions. The extrinsic ones instead analyze recreational-tourist variables based on the conditions of use (Bote, 2002). Likewise, Zamorano (2002) refers to the extrinsic criteria: conditions of access, degree of conservation, conditions of use and recreation and security.

These two types of criteria have been adapted to the characteristics of Canton Paltas resources. Table 1 shows the criteria established for the two categories.

Espirales. Revista multidisciplinaria de investigación científica, vol 4, No. 34
Julio-septiembre 2020. e-ISSN 2550-6862. págs 14-34

Table 1. Intrinsic and extrinsic criteria for the evaluation of tourism resources

Intrinsic criteria			
Resource type	**Criterion**	**Attribute**	**Description**
Terrestrial	a) Coverage	a_1) Vegetation	Abundant (A) Sufficient (S) Little (E)
	b) Ground conditions	b_1) Gradient	Very Inclined (MI) Inclined (I) Something Inclined (AI) Plane (P)
		b_2) Surface	Stony (Pe) Dirt Road (T) Wet (H) Compact (C) Grassland (Pa) Other (O)
		b_3) Difficulty	High (A) Medium (M) Low (B)
Aquatic (water flows)	c) Characteristics	c_1) Width	Meters
		c_2) Transparency	Crystalline (C) Semi Turbid (S) Turbid (T)
		c_3) Visible extent	1 to 3 m. (A) 3 to 6 m. (B) 6 to 10 m (C) More than 10 m (D)
	d) Additional appeal	d_1) Fauna	Yes (S) No (N)
Cultural manifestations	e) Characteristics	e_1) Traditional state	Excellent (E) Good (B) Bad (M)

Intrinsic criteria			
Resource type	**Criterion**	**Attribute**	**Description**
		e_2) Diffusion	Local (L) Regional (R) National (N) International (I)
		e_3) Community participation	Yes (S) No (N)
	c) Promotion	f_1) Promotion means	Web (W) TV (T) Radio (R) Magazines (Re)
Extrinsic criteria			
Criterion	**Attribute**		
Physical access	g_1) Distance		
	g_2) Time		
Possibilities of appreciation	h_1) State of conservation		
	h_2) Environment quality		
	h_3) Fragility		
	h_4) Contamination		
Infrastructure and services	i_1) Signaling		
	i_2) Equipment		
	i_3) Recreational facilities		
	i_4) Activities		
Security	j_1) Surveillance		

Source: Franco-Maass et al. (2009, p. 217)

Once the variables and attributes to be considered were defined according to the information obtained in the field, the matrix was obtained with the qualitative or quantitative characterization of each resource for each of the criteria. Table 2 below presents the characterization of the intrinsic criteria based on the type and name of the resources.

Espirales. Revista multidisciplinaria de investigación científica, vol 4, No. 34
Julio-septiembre 2020. e-ISSN 2550-6862. págs 14-34

Table 2. Construction of the intrinsic criteria for the analysis

Means	**Criteria**			
Terrestrial (Hills, ravines, parks, etc.)	**Vegetation**	**Gradient**	**Surface**	**Difficulty**
	$a_{1(1)}$	**b_1(2)**	**b_2(3)**	**b_3(4)**
(Forest) Bosque Zapotepamba	S	P	O	B
(Mount) Cerro Chamba	S	I	H	M
(Hill) Loma La Capilla	E	AI	T	B
(Hill) Loma Mayor	E	AI	Pe	M
(Forest) Bosque Suquinda	A	AI	Pa	M
(Mount) Cerro Guanchuro	A	AI	H	B
(Mount) Cerro Padre Hurco	S	MI	Pe	M
(Mount) Cerro Tarimbo	S	AI	H	B
(Rock) Peña Shiriculapo	A	AI	Pe	B
(Mount) Cerro Pisaca	A	AI	T	B
Aquatic (Water Flows)	**Width**	**Transparency**	**Visible extent**	**Fauna**
	c_1	**c_2(5)**	**c_3(6)**	**d_1(7)**
(Stream) Chorro el Almendral	1 m	C	B	N
(Waterfall) Cascada de las Mariposas	4 m	S	A	S
(Waterfall) Cascadas de las Minas	3 m	S	A	S
Cultural manifestations	**Traditional state**	**Diffusion**	**Community participation**	**Media**
	e_1(8)	**e_2(9)**	**e_3(10)**	**f_1(11)**
Zapotepamba Binational Technical Training Center (Centro Binacional de Formación Técnica Zapotepamba)	E	R	S	W
National Institute for Agricultural Research (Instituto Nacional de investigaciones Agropecuarias)	R	R	S	W

Means	Criteria			
Yamana Heritage Houses (Casas patrimoniales de Yamana)	B	L	S	W
Yamana Central Church (Iglesia Central de Yamana)	B	L	S	R
Image sharing	E	L	S	R
Barrial Blanco Petroglyphs (Petroglifos del Barrial Blanco)	B	L	N	W
Rinconada Petroglyphs (Petroglifos de la Rinconada)	M	L	N	W
Polo Petroglyphs (Petroglifos Polo)	B	L	N	W
Fatima Lookout (Mirador de Fátima)	B	L	S	W
Catacocha Heritage Houses (Casas Patrimoniales de Catacocha)	E	N	S	W
Matriz Catacocha Church (Iglesia Matriz Catacocha)	B	L	S	W
Joaquin Leiba brothers museum (Museo de los hermanos Joaquin Leiba)	B	L	S	W
Indio Paltense	M	L	N	W
Tasines de Playas alto	B	L	N	W

Source: author's own elaboration.

Similarly, based on the variables already established and field work, it has been possible to construct the matrix with extrinsic criteria for each of the resources that the Canton Paltas possesses. Table 3 establishes the characterization of the extrinsic criteria.

Table 3. Construction of extrinsic criteria for analysis

Resources	Criteria										
	Physical access		Possibilities of appreciation				Infrastructure and services				Security
Terrestrial (Hills, ravines, parks, etc)	g_1	g_2	$h_1(1)$	$h_2(2)$	$h_3(3)$	$h_4(4)$	$i_1(5)$	$i_2(5)$	$i_3(6)$	i_4	$j_1(7)$
(Forest) Bosque Zapotepamba	26.7 km	35m	R	B	A	S	I	A	A	5	Mo
(Mount) Cerro Chamba	26.7 km	35 m	B	B	M	N	I	N	B	4	Mo
(Hill) Loma La Capilla	24.5 km	29 m	R	R	M	N	N	N	B	1	I
(Hill) Loma Mayor	19.9 km	23 m	B	O	M	N	N	N	B	4	I
(Forest) Bosque Suquinda	19.6 km	26 m	B	O	M	N	A	I	B	3	S
(Mount) Cerro Guanchuro	4.3 km	15 m	E	O	A	N	I	I	B	2	Mo
(Mount) Cerro Padre Hurco	7.1 km	13 m	R	B	M	N	I	I	B	1	I
(Mount) Cerro Tarimbo	14.3 km	17 m	B	B	M	N	N	I	B	1	I
(Rock) Peña Shiriculapo	0.35 km	4 m	E	O	M	S	S	S	M	3	M
(Mount) Cerro Pisaca	12 km	20 m	E	B	M	N	I	I	M	2	I
Aquatic (Water Flows)											
(Stream) Chorro el Almendral	19 km	29 m	B	B	MA	S	A	I	B	1	I
(Waterfall) Cascada de las Mariposas	19.6 km	26 m	R	B	MA	S	A	N	B	1	I
(Waterfall) Cascadas de las Minas	19 km	20 m	R	R	MA	S	N	N	B	1	I
Cultural manifestations											
Zapotepamba Binational Technical Training Center (Centro Binacional de Formación Técnica Zapotepamba)	26 km	29 m	E	O	A	N	A	S	M	7	M

Resources	Criteria										
	Physical access			Possibilities of appreciation				Infrastructure and services			Security
National Institute for Agricultural Research (Instituto Nacional de investigaciones Agropecuarias)	26.9 km	29 m	B	B	MA	S	I	A	A	1	M
Yamana Heritage Houses (Casas patrimoniales de Yamana)	18.5 km	15 m	B	B	A	S	N	A	M	1	S
Yamana Central Church (Iglesia Central de Yamana)	18. 9 km	15 m	B	R	A	S	N	A	B	2	S
Image sharing	21.7 km	31 m	B	O	B	S	N	I	B	1	I
Barrial Blanco Petroglyphs (Petroglifos del Barrial Blanco)	21.7 km	31 m	B	B	A	N	I	N	B	2	I
Rinconada Petroglyphs (Petroglifos de la Rinconada)	19km	20 m	B	B	M	S	A	I	B	2	I
Polo Petroglyphs (Petroglifos Polo)	19. 4 km	26 m	R	R	MA	S	A	I	B	1	Mo
Fatima Lookout (Mirador de Fátima)	1.7 km	10 m	B	O	B	S	I	I	B	2	I
Catacocha Heritage Houses (Casas Patrimoniales de Catacocha)	1 km	5 m	E	O	MA	S	A	S	B	3	S
Matriz Catacocha Church (Iglesia Matriz Catacocha)	1 km	10 m	E	O	MA	N	A	S	M	2	S
Joaquin Leiba brothers museum (Museo de los hermanos Joaquin Leiba)	3 km	2 m	B	B	M	N	A	A	B	3	S
Indio Paltense	2 km	3 m	B	R	B	N	I	I	B	1	I

Espirales. Revista multidisciplinaria de investigación científica, vol 4, No. 34
Julio-septiembre 2020. e-ISSN 2550-6862. págs 14-34

Resources		Criteria									
		Physical access			Possibilities of appreciation			Infrastructure and services			Security
Tasines de Playas alto		10 km	5 m	R	R	M	S	N	N	B	2	I
[1] E = Excellent B = Good R = Regular M = Bad	[2] O = Optimum G = Good R = Regular L = Low	[3] MA = Very high H = High M = Moderate B = Low	[4] Y = Yes N = No		[5] S = Sufficient A = Some I = Insufficient N = None			[6] A = Recreational facilities M = Elements capable of recreation B = No recreational place		[7] M = Very safe S = Safe Mo = Moderate I = Unsafe	

Source: author's own elaboration.

Once the criteria tabulation was done, it was proceeded to transform them on a scale between 1 and 10. The value of each attribute represents the degree to which each alternative meets the assessment objective, with 10 being the maximum possible value and 1 the minimum value, thereby obtaining the matrix.

Table 4. Decision matrix with normalized values

Resources	Intrinsic attributes						
Terrestrial (Hills, ravines, parks, etc.)	**va1**	**vb1**	**vb2**	**vb3**	**Summation**	**Average**	**40 %**
(Forest) Bosque Zapotepamba	9.0	8.0	2.5	3.0	22.5	5.6	2.3
(Mount) Cerro Chamba	9.0	6.0	3.5	7.0	25.5	6.4	2.6
(Hill) Loma La Capilla	5.0	7.5	8.0	6.5	27.0	6.8	2.7
(Hill) Loma Mayor	5.0	7.5	7.0	6.7	26.2	6.6	2.6
(Forest) Bosque Suquinda	10.0	9.0	5.0	5.0	29.0	7.3	2.9
(Mount) Cerro Guanchuro	10.0	8.0	4.0	3.0	25.0	6.3	2.5
(Mount) Cerro Padre Hurco	9.0	6.0	7.5	6.5	29.0	7.3	2.9
(Mount) Cerro Tarimbo	9.0	7.5	4.0	3.0	23.5	5.9	2.4

Resources	**Intrinsic attributes**						
Terrestrial (Hills, ravines, parks, etc.)	**va1**	**vb1**	**vb2**	**vb3**	**Summation**	**Average**	**40 %**
(Rock) Peña Shiriculapo	10.0	10.0	9.0	3.0	32.0	8.0	3.2
(Mount) Cerro Pisaca	10.0	10.0	8.0	1.0	29.0	7.3	2.9
Aquatic (Water Flows)	**vc1**	**vc2**	**vc3**	**vd1**	**Summation**	**Average**	**40%**
(Stream) Chorro el Almendral	4.0	8.0	6.0	1.5	19.5	4.9	2.0
(Waterfall) Cascada de las Mariposas	6.0	6.5	8.5	10.0	31.0	7.8	3.1
Cascadas de las minas	5.0	6.0	8.0	8.5	27.5	6.9	2.8
Cultural manifestations	**ve1**	**ve2**	**ve3**	**vf1**	**Summation**	**Average**	**40%**
Zapotepamba Binational Technical Training Center (Centro Binacional de Formación Técnica Zapotepamba)	10.0	5.0	10.0	10.0	35.0	8.8	3.5
National Institute for Agricultural Research (Instituto Nacional de investigaciones Agropecuarias)	6.0	5.0	8.0	8.0	27.0	6.8	2.7
Yamana Heritage Houses (Casas patrimoniales de Yamana)	8.0	1.0	10	10	29.0	7.3	2.9
Yamana Central Church (Iglesia Central de Yamana)	8.0	1.0	10	5.0	24.0	6.0	2.4
Image sharing	10.0	1.0	10	10	31.0	7.8	3.1
Barrial Blanco Petroglyphs (Petroglifos del Barrial Blanco)	8.0	1.0	1.0	10	20.0	5.0	2.0
Rinconada Petroglyphs (Petroglifos de la Rinconada)	4.0	1.0	1.0	10	16.0	4.0	1.6
Polo Petroglyphs (Petroglifos Polo)	8.0	1.0	1.0	10	20.0	5.0	2.0
Fatima Lookout (Mirador de Fátima)	8.0	1.0	10	10	29.0	7.3	2.9
Catacocha Heritage Houses (Casas Patrimoniales de Catacocha)	10.0	8	10	10	38.0	9.5	3.8
Matriz Catacocha Church (Iglesia Matriz Catacocha)	8.0	1.0	10	10	29.0	7.3	2.9

Espirales. Revista multidisciplinaria de investigación científica, vol 4, No. 34
Julio-septiembre 2020. e-ISSN 2550-6862. págs 14-34

Resources	**Intrinsic attributes**						
Terrestrial (Hills, ravines, parks, etc.)	**va1**	**vb1**	**vb2**	**vb3**	**Summation**	**Average**	**40 %**
Joaquin Leiba brothers museum (Museo de los hermanos Joaquin Leiba)	8.0	1.0	10	10	29.0	7.3	2.9
Indio Paltense	4.0	1.0	10	10	25.0	6.3	2.5
Tasines de Playas alto	8.0	1.0	10.0	10.0	29.0	7.3	2.9

Source: author's own elaboration.

Table 5. Decision matrix with normalized values

Resources	**Extrinsic attributes**													
Terrestrial	**vg1**	**vg2**	**vh1**	**vh2**	**vh3**	**vh4**	**Vi 1**	**vi2**	**vi3**	**vi4**	**vj1**	Summation	Average	60 %
(Forest) Bosque Zapotepamba	7.0	8.0	6.0	7.0	8.0	10.0	5.0	8.0	10.0	10.0	6.0	85.0	7.7	4.6
(Mount) Cerro Chamba	7.0	8.0	8.0	7.0	4.0	1.0	5.0	1.0	2.0	7.0	6.5	56.5	5.1	3.1
(Hill) Loma La Capilla	7.5	8.0	6.0	3.0	4.0	1.0	1.0	1.0	2.0	4.0	1.0	38.5	3.5	2.1
(Hill) Loma Mayor	8.0	8.0	8.0	10.0	4.0	1.0	1.0	1.0	2.0	7.0	1.0	51.0	4.6	2.8
(Forest) Bosque Suquinda	10.0	9.0	8.0	10.0	7.0	1.0	8.0	6.0	3.5	6.5	9.0	78.0	7.1	4.3
(Mount) Cerro Guanchuro	9.0	9.5	10.0	10.0	8.0	1.0	5.0	5.0	2.0	5.0	6.3	70.8	6.4	3.9
(Mount) Cerro Padre Hurco	8.5	8.6	6.0	7.0	4.0	1.0	5.0	5.0	2.0	4.0	1.0	52.1	4.7	2.8
(Mount) Cerro Tarimbo	8.0	8.0	8.0	7.0	4.0	1.0	1.0	5.0	2.0	4.0	1.0	49.0	4.5	2.7
(Rock) Peña Shiriculapo	10.0	9.5	10.0	10.0	4.0	10.0	10	10	8.0	6.0	10	97.5	8.9	5.3
(Mount) Cerro Pisaca	10	8.0	10	7.0	4.0	1.0	5.0	5.0	8.0	5.0	1.0	64.0	5.8	3.5
Aquatic (Streams)														
(Stream) Chorro el Almendral	8.0	8.5	8.0	7.0	10	10	8.0	5.0	2.0	4.0	1.0	71.5	6.5	3.9

Resources	**Extrinsic attributes**													
Terrestrial	**vg1**	**vg2**	**vh1**	**vh2**	**vh3**	**vh4**	**Vi 1**	**vi2**	**vi3**	**vi4**	**vj1**	Summation	Average	60 %
(Waterfall) Cascada de las Mariposas	8.0	8.9	6.0	7.0	10	10.0	8.0	1.0	2.0	4.0	1.0	65.9	6.0	3.6
(Waterfall) Cascadas de las minas	8.3	9.0	6.0	3.0	10	10.0	1.0	1.0	2.0	4.0	1.0	55.3	5.0	3.0
Cultural manifestations														
Zapotepamba Binational Technical Training Center (Centro Binacional de Formación Técnica Zapotepamba)	10.0	9.0	10.0	10.0	9.0	10.0	9.0	9.0	10.0	10.0	9.0	105	9.5	5.7
National Institute for Agricultural Research (Instituto Nacional de investigaciones Agropecuarias)	8.0	8.0	8.0	8.0	6.0	9.0	5.0	7.0	8.0	2.0	8.0	77	7.0	4.2
Yamana Heritage Houses (Casas patrimoniales de Yamana)	8.0	8.0	8.0	7.0	8.0	10.0	5.0	1.0	5.0	4.0	6.8	70.8	6.4	3.9
Yamana Central Church (Iglesia Central de Yamana)	9.0	9.0	8.0	3.0	8.0	10.0	5.0	1.0	2.0	5.0	7.5	67.5	6.1	3.7
Image sharing	8.0	9.0	8.0	10.0	1.0	10.0	1.0	1.0	2.0	4.0	1.0	55	5.0	3.0
Barrial Blanco Petroglyphs (Petroglifos del Barrial Blanco)	8.0	8.7	8.0	7.0	8.0	1.0	5.0	5.0	2.0	5.0	1.0	58.7	5.3	3.2
Rinconada Petroglyphs (Petroglifos de la Rinconada)	8.5	8.6	6.0	7.0	5.0	10.0	8.0	7.0	2.0	5.0	1.0	68.1	6.2	3.7
Polo Petroglyphs (Petroglifos Polo)	8.5	9.0	8.0	3.0	10	10	8.0	7.0	2.0	4.0	7.5	77	7.0	4.2

Espirales. Revista multidisciplinaria de investigación científica, vol 4, No. 34
Julio-septiembre 2020. e-ISSN 2550-6862. págs 14-34

Resources	Extrinsic attributes													
Terrestrial	**vg1**	**vg2**	**vh1**	**vh2**	**vh3**	**vh4**	**Vi 1**	**vi2**	**vi3**	**vi4**	**vj1**	Summation	Average	60 %
Fatima Lookout (Mirador de Fátima)	8.0	8.0	8.0	10	1.0	10	5.0	5.0	2.0	5.0	1.0	63	5.7	3.4
Catacocha Heritage Houses (Casas Patrimoniales de Catacocha)	10	9.0	9.0	10	10	9.0	8.0	9.0	8.0	6.0	6.0	96	8.7	5.2
Matriz Catacocha Church (Iglesia Matriz Catacocha)	10	8.0	8.0	8.0	9.0	1.0	8.0	9.0	2.0	5.0	8.0	76	6.9	4.1
Joaquin Leiba brothers museum (Museo de los hermanos Joaquin Leiba)	9.5	9.0	8.0	7.0	5.0	1.0	8.0	9.0	2.0	6.0	8.0	72.5	6.6	4.0
Indio Paltense	8.0	7.9	8.0	3.0	1.0	1.0	5.0	5.0	2.0	4.0	1.0	45.9	4.2	2.5
Tasines de Playas alto	8.0	8.5	6.0	3.0	5.0	10	1.0	1.0	2.0	5.0	1.0	50.5	4.6	2.8

Source: author's own elaboration.

Results

Because there were four different groups of intrinsic criteria such as: terrestrial, aquatic (water flows), aquatic (lakes) and cultural manifestations; the evaluation involved applying, for each of the groups, the weighted linear summation. Based on the combination procedure, the final evaluation of each of the tourist resources was obtained based on their relevance for the tourist development of Canton Paltas.

Table 6. Results obtained from the linear combination of attributes (standardized criteria)

Resources	Linear Sum of Intrinsic Resources	Linear Sum of Extrinsic Resources	Weighted Sum of Intrinsic Criteria	Weighted Sum of Extrinsic Criteria	Final Value of Weights	Preference order
(Forest) Bosque Zapotepamba	22.50	85.00	2.3	4.6	6.89	7

Resources	Linear Sum of Intrinsic Resources	Linear Sum of Extrinsic Resources	Weighted Sum of Intrinsic Criteria	Weighted Sum of Extrinsic Criteria	Final Value of Weights	Preference order
(Mount) Cerro Chamba	25.50	56.50	2.6	3.1	5.63	21
(Hill) Loma La Capilla	27.00	38.50	2.7	2.1	4.80	27
(Hill) Loma Mayor	26.20	51.00	2.6	2.8	5.40	22
(Forest) Bosque Suquinda	29.00	78.00	2.9	4.3	7.15	4
(Mount) Cerro Guanchuro	25.00	70.80	2.5	3.9	6.36	12
(Mount) Cerro Padre Hurco	29.00	52.10	2.9	2.8	5.74	19
(Mount) Cerro Tarimbo	23.50	49.00	2.4	2.7	5.02	25
(Rock) Peña Shiriculapo	32.00	97.50	3.2	5.3	8.52	3
(Mount) Cerro Pisaca	29.00	64.00	2.9	3.5	6.39	11
(Stream) Chorro el Almendral	19.5	71.5	1.95	3.9	5.85	17
(Waterfall) Cascada de las Mariposas	31	65.9	3.1	3.6	6.69	10
(Waterfall) Cascadas de las minas	27.5	55.3	2.75	3.0	5.77	18
Zapotepamba Binational Technical Training Center (Centro Binacional de Formación Técnica Zapotepamba)	35	105	3.5	5.7	9.23	1
National Institute for Agricultural Research (Instituto Nacional de investigaciones Agropecuarias)	27	77	2.7	4.2	6.90	6
Yamana Heritage Houses (Casas patrimoniales de Yamana)	29	70.8	2.9	3.9	6.76	9
Yamana Central Church (Iglesia Central de Yamana)	24	67.5	2.4	3.7	6.08	16
Image sharing	31	55	3.1	3.0	6.10	15

Espirales. Revista multidisciplinaria de investigación científica, vol 4, No. 34
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Resources	Linear Sum of Intrinsic Resources	Linear Sum of Extrinsic Resources	Weighted Sum of Intrinsic Criteria	Weighted Sum of Extrinsic Criteria	Final Value of Weights	Preference order
Barrial Blanco Petroglyphs (Petroglifos del Barrial Blanco)	20	58.7	2	3.2	5.20	24
Rinconada Petroglyphs (Petroglifos de la Rinconada)	16	68.1	1.6	3.7	5.31	23
Polo Petroglyphs (Petroglifos Polo)	20	77	2	4.2	6.20	14
Fatima Lookout (Mirador de Fátima)	29	63	2.9	3.4	6.34	13
Catacocha Heritage Houses (Casas Patrimoniales de Catacocha)	38	96	3.8	5.2	9.04	2
Matriz Catacocha Church (Iglesia Matriz Catacocha)	29	76	2.9	4.1	7.05	5
Joaquin Leiba brothers museum (Museo de los hermanos Joaquin Leiba)	29	72.5	2.9	4.0	6.85	8
Indio Paltense	25	45.9	2.5	2.5	5.00	26
Tasines de Playas alto	29	50.5	2.9	2.8	5.65	20

Source: author's own elaboration.

Once the assessment was made, it was identified that in terms of cultural interest, the resource that has the greatest tourist potential is the Binational Technical Training Center Zapotepamba, belonging to the Universidad Nacional de Loja, it has all the necessary accesses, adequate infrastructure and basic services and it has agricultural programs, because they are on the main road that connects the cantonal head with the other cantons. As it could be seen in the table, the extrinsic criteria have a higher score, which shows that it has great potential for developing tourism. Likewise, due to its location, this tourist resource is in full view of all the tourists who visit Canton Paltas. However, there are other resources that can be used for tourism purposes, this is the case of the Heritage Houses of Catacocha (Casas Patrimoniales de Catacocha), a place that is located in the cantonal head, it has the necessary infrastructure to promote tourism in the area, basic services, among others, is important to give good use that benefits the community; on the other hand, in third row is the (Rock) Peña Shiriculapo, is

a well-known attraction but it is not enough to have a good promotion, but it also has all the facilities for tourists to access it.

Likewise, with the evaluation it was possible to determine that, the tourist resource that obtained a low score is (Rock) Peña de los Espíritus, since it did not meet all the proposed criteria, since it does not depend only on its potential, but also on its state of conservation, community participation and promotion.

A general analysis of the results obtained makes it possible to establish that the extrinsic criteria exert the most determining influence on the evaluation. Likewise, what causes an attraction to have a low score is also due to the lack of equipment, infrastructure and security, it is a fundamental part of any attraction to have these requirements, since tourists visit places that make them feel safe and preserve their landscaping beauty. It should be noted that the ranking made it possible to appreciate that many tourist resources and attractions of the aforementioned parishes are sites that, with good administration, can carry out undertakings and therefore help in a process of tourist development, taking advantage of them in the best way, without causing any impact.

Discussion

The Yamana, Casanga and Catacocha parishes have natural and cultural tourist attractions, to carry out different activities according to their preference, it is worth mentioning that there are 27 inventoried attractions, most of them correspond to cultural manifestations, this group is important as people are interested for knowing the culture of a town, its customs, traditions and ways of living together; all this makes it unmatched in value, making the place more attractive. The inventory reflects the variety of tourist attractions and with this, tourism activity can be further promoted, always towards a sustainable vision. On the other hand, inventoried natural resources are undoubtedly important elements which have characteristics that anyone would be interested in visiting. Despite the lack of maintenance of the same and the disinterest on the part of the authorities, people do not have the spirit to know these places and choose to look for other destinations.

The appropriate selection of an inventory of tourist resources and a multi-criteria evaluation become a guide that allows us to identify the current tourist offer and the actions that are still to be carried out in the destination; it will allow designing strategies or proposals for the development of tourist products, generating a minimum impact.

The evaluation carried out has made possible to clearly differentiate the resources with the greatest attributes for recreational use based on their own characteristics. However, it is important to mention that the evaluation carried out has as a limitation the lack of consideration

of the social actors linked to the resources, since they are an important part of establishing future projects or ventures.

Conclusions

Therefore, it is considered that the evaluation of tourist resources and attractions are a necessary tool to guide decision-making in the tourist planning and development processes carried out for any destination. The contribution of this article lies in the application of multi-criteria evaluation as a very useful method to obtain a hierarchy of resources according to the proposed criteria. For this reason, obtaining an adequate inventory allowed defining the attributes and analysis criteria used in the MCE, resulting in an appropriate strategy to qualify them quantitatively. Likewise, it allowed obtaining favorable results, which will later serve as a basis for establishing or proposing future tourism products, increasing the supply and therefore the demand.

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