Valorisation of Landscape Resources in Andean Communal Territories, Apurímac Region, Peru

Felipe Rafael Valle Díaz[1]*, Fernando Eduardo Cano Legua[2]*, Rosa Luz Galindo Pasache[3], William Camilo Yauris Polo[4], Erika Belinda Ramírez Altamirano[5], Nieves Sandra Cuadros Luna[6], César Augusto Ediberto Levano Salazar[7]

[1]Universidad Nacional José María Arguedas. Email: fvalle@unajma.edu.pe
[2]Universidad Nacional San Luis Gonzaga. Email: feedcan@gmail.com
[3]Universidad Nacional San Luis Gonzaga. Email: rosa.galindo@unica.edu.pe
[4]Universidad Nacional José María Arguedas. Email: wyauris@unajma.edu.pe
[5]Universidad Nacional José María Arguedas. Email: ebramirez@unajma.edu.pe
[6]Universidad Nacional San Luis Gonzaga. Email: nieves.cuadros@unica.edu.pe
[7]Universidad Nacional San Luis Gonzaga. Email: cesar.levano@unica.edu.pe

*Correspondence: Email: fvalle@unajma.edu.pe and feedcan@gmail.com

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Abstract
This research examines ecotourism as a sustainable way to utilize natural resources by providing tourists with various activities and attractions. In this context, the natural landscape refers to a specific area with exploitable environmental features, typically at the micro-basin level. The goal was to assess the economic value of landscape resources in rural communities in Andahuaylas by 2024. The study utilized a basic case-study design in a mixed-methods, non-experimental approach. Sampling involved selecting tourists aged 18 to 60 based on inclusion and exclusion criteria, rather than random selection. Key findings include: (a) identification of two ecotourism sites with well-preserved natural assets, namely the "Forests–Viewpoint–Inca Trail–Llaqtapata" and "Apu Timani Forest and Viewpoint" locations; (b) a revealed preference method indicating that Llaqtapata was valued 200 pen higher and Apu Timani 155 pen higher than alternative sites; and (c) a stated preference method suggesting an average maximum value of 160 pen for Llaqtapata and 150 pen for Apu Timani. The study reveals that the maximum economic value for Llaqtapata is 360 pen, while for Apu Timani it is 305 pen. These findings highlight the potential for environmentally-focused tourism to contribute to the local economy through sustainable natural resource utilization.

Keywords: Ecotourism Resources; Communal Territories, Landscape Potential; Relieved Preference; Stated Preference

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INTRODUCTION

The Apurímac region of Peru is a repository of cultural memory and ecological abundance, yet its landscape resources remain underutilized in economic terms. In these Andean communal territories, where land holds spiritual and social significance, ecotourism emerges as a viable path for sustainable development. Even with high biodiversity and heritage, monetising landscape values in rural Peru is constrained by low visibility and fragmented policy. Natural landscapes particularly those owned by indigenous people provide a mix of aesthetic, ecological, and economic values[1].

The global shift toward green economies has heightened interest in community-led ecotourism ventures in mountainous regions[2]. Localized valuation of non-market environmental goods is essential to guide equitable development and conservation strategies. The Andean highlands provide a compelling case study to apply integrated valuation approaches for natural capital[3]. Addressing this gap can align environmental stewardship with economic inclusion in marginalized mountain communities. This study examines landscape resource valorisations in Apurímac through a mixed-method lens, incorporating both revealed and stated preference frameworks. The department of Apurimac presents differentiated panorama in terms of land and natural resoucer tenure. These communities manage extensive areas, ranging in size from 24,000 hectares to 500 hectares, in which a considerable amount of "natural patrimony" is located, which means the set of natural or environmental goods and wealth that society has inherited from its ancestors[4]. "Ecotourism" is understood as the way in which ecology and tourism are economically exploited by offering diverse options to attract tourist. In the communal territories, there are diverse natural resources; therefore, the "natural landscape" is a territory delimited at the micro-basin level that contains natural characteristics such as: relief, hydrography, and ecosystems[5]. In the Apurimac region, there are tourism resources with unique landscape potential, which are not being valued and are in the process of being put in value[6].

Research on landscape resource valuation increasingly recognizes that natural environments possess multiple dimensions of value beyond their aesthetic appeal. Traditional approaches often focused narrowly on scenic beauty or direct economic gains, neglecting cultural, ecological, and social dimensions embedded in landscapes. Recent discussions emphasize a more integrated perspective that acknowledges landscapes as complex socio-ecological systems, where natural resources support both biodiversity and community livelihoods[7]. In rural and mountainous regions, community-based ecotourism has emerged as a strategic pathway for sustainable development. Local knowledge and participatory planning are seen as essential components of successful ecotourism models, enabling communities to define, manage, and benefit from their own resources[8]. By actively involving residents in decision-making, tourism development can avoid the pitfalls of top-down interventions that often fail to address local needs or environmental limits.

Furthermore, valuing landscapes requires recognizing both tangible and intangible elements, such as spiritual connections, traditional practices, and local identity. This broader approach supports a more equitable distribution of benefits and responsibilities among stakeholders. It also encourages the integration of diverse perspectives in land-use planning, fostering collaborative governance frameworks that balance conservation with development goals[9]. There is growing awareness that economic valuation tools need to be adaptable to local contexts, combining qualitative insights with quantitative measures to capture the full spectrum of landscape values. Techniques such as surveys, interviews, and participatory mapping help to reveal local priorities and perceptions that may not be visible through market-based assessments alone[10]. These approaches enable more nuanced, place-specific planning that can enhance the resilience of rural economies while safeguarding ecological integrity. Ultimately, the evolving understanding of landscape valuation supports the idea that sustainable tourism development is not merely about attracting visitors but about creating systems that strengthen local capacity, preserve cultural heritage, and ensure the long-term stewardship of natural resources[11]. This more holistic perspective offers a framework for integrating environmental, social, and economic objectives in the management of rural landscapes.

Peruvian Andean communal territories are more than just landscapes; they contain significant cultural, ecological, and spiritual values linked to how indigenous people live and identify. Over the last several years, more importance has been placed on landscape valorisation for protecting, preserving, and including these many values in sustainable and territorial planning. However, landscape studies commonly focus on monetary and aesthetic aspects, without considering the cultural or ecological significance of these places[12]. Creating detailed knowledge of landscape value in regions like Apurímac helps and protect both biodiversity and the health of indigenous people.

The goal of this study is to learn about and document the various aspects of landscape valorisation in Apurímac's communal territories using local viewpoints, participatory processes, and various disciplines to improve how these landscapes are managed. The investigation serves to demonstrate that the natural and tourist heritage has value and is necessary to understand it. This will allow us to organize a series of interventions, ranging from research to the strengthening of the entrepreneurial culture in the Peasant Community. This research thus aims to quantify the economic value of ecotourism resources in the Apurímac highlands using user-based valuation models. By focusing on two sites, Llaqtapata Inca Trail and Apu Timani Forest, we analyse tourist preferences, price structures, and perceived value. The dual valuation methodology allows for deeper insight into both actual behaviour and hypothetical willingness to pay. In doing so, the study advances our understanding of landscape valuation beyond aesthetics toward tangible socio-economic returns. Through this empirical inquiry, we seek to guide policy and planning strategies rooted in community needs and ecological integrity. The emphasis on participatory and place-based evaluation aims to centre indigenous perspectives often overlooked in market valuation. This paper builds on existing ecological economic theory while integrating spatial and behavioural insights. The research outputs aim to contribute to rural economic diversification in line with Peru's decentralisation and sustainability agendas. The findings have practical implications for community tourism, conservation incentives, and regional development. The subsequent sections describe the methodological design, analytical techniques, and empirical results underpinning the valuation process.

MATERIALS AND METHODS

The research was carried out in the Apurimac region, province of Andahuaylas, districts of Pacobamba and Kakiabamba. The micro-locations are the Ccerabamba Andean Communities, the Pacchani and Cocairo sectors respectively. The population were hikers from the cities of Andahuaylas, Talavera and San Jeronimo in the range of 18 to 60 years old, with the inclusion criterion that they had visited the Ccerabamba Forests, Chinchay and Apu Timani. The sample was intentional, because the investigation collect detailed information for each ecotourism resources and it is a non-probabilistic sample, because the study will only obtain information from citizens between the ages of 18 to 60 years old, under the inclusion criterion.

According to Kwoczynska*, et al.*[13], it is a basic research, adhered to the case study, because the study seeks to specify the economic value from the application of two methods, the difference will allow the study to understand the incident and convenience to value from a relevant method for future projects that could be implemented. Framed within the mixed approach, by the intervention of qualitative and quantitative collection instruments. The design was descriptive, the study raised the situational diagnosis, then the methodology based on two methods is applied, the systematization continues, the investigation interpret, obtaining a final result of economic quantification[14]. The data collection techniques known as the checklist and the instrument was the travel and services cost collection form. For the stated preference or indirect value method, the techniques was the survey and the contingent value declaration questionnaire.

The guiding model applied in a partial way was from Meini*, et al.*[15] for the economic valuation of natural heritage in natural protected areas, who demonstrated the usefulness of economic valuation methods for non-market goods, where it affects the application of direct use value (incident) and contingent (les incident). The main limitation was the scarcity of valid data, because natural resources have different uses and are associated with different values towards subsistence activities and the market was no table to capture these values[16]. It assigns economic value to the natural patrimony responding to the equation: TEV= VUD + VO; where: TEV: total economic value which is equal to VUD or direct economic value (travel cost and other services) and VO optional or contingent value; therefore, its value resides in the goods and services of current direct use and to a lesser degree in the potential value. The Natural Protected Area (NPA) can have both direct and indirect uses. The first uses are highly restricted and the impacts is minimal, examples includes national Parks, natural sanctuaries, and historical sanctuaries. The manipulative scientific research cannot be applied. Secondly, the use of the resources and impact to the ecosystem are more intense, extraction is allowed, exploitation by local populations, manipulative scientific research can be applied. These includes communal reserves, national reserves, hunting preserves, wildlife refuges, landscape reserves, protection forests, etc. The direct use value includes: hunting, fishing, beekeeping, grazing and/or ecotourism.

To complement primary data collection, informal interviews with local tourism operators provided insights into logistical constraints and seasonal visitor patterns. Observational notes during site visits documented trail conditions, signage, and existing visitor facilities to assess readiness for sustainable tourism. The research design also

considered the socio-cultural context, recognizing communal land governance structures that influence tourism management. Secondary data on regional tourism trends and demographic profiles were reviewed to situate the sites within broader market dynamics. Participatory discussions with community members explored perceptions of tourism development, expectations for benefits, and potential concerns. The study included preliminary mapping of biodiversity features, such as native flora and fauna, to support future conservation planning. Ethical considerations were addressed by ensuring informed consent from all participants and respecting community norms during fieldwork. Data management protocols involved careful anonymisation of survey responses to protect participant privacy. The mixed-methods approach was selected specifically to bridge quantitative valuation models with local knowledge and subjective experiences. Results from the methods were designed to be shared with local stakeholders to support decision-making and strengthen community ownership of tourism initiatives.

RESULTS

Identification and Description of Tourism Resources

The eco-tourist resources, which respond to the concept of natural capital and add anthropological capital (cultural manifestations), can be exploited for their landscape reserve, bird watching and flora species.

a) The Inca Trail of Llaqtapata-Chinchay Forest-Llaqtapata Citadel: Located in the district of Pacobamba, has biological diversity, bridle paths, internal trails, places to spend the night and camp, suitable for hiking, trekking, camping, bird watching and other species. In addition, archaeological resources, which are located in the summits, form from niches (caves) to citadel, with different levels of terraces, passages, stairs of access between levels, circular houses with levels of Access to colcas. THa Inca Trail, a stretch of more than six kilometres long. To the back, the private forest of Chinchay is located, it has an exceptional panoramic view, in addition to the diversity of species.
b) The Circuit of the Mirador and Apu Timani Forest: Located in the district of Kiakabamba, in the annex or sector of Cocairo, there is biological diversity of quechua zone, puna, bridle paths, places to spend the night and camping, suitable for the practice of hiking, trekking, camping, which allows the sighting of birds and other species. It has a mixture of natural and archaeological capital composition, to be discovered and in expansion.

Next, the study details the satellite photography, indicating geographic measurements that allows to located and identify the ecotourism resource, the antiquity of the photography allows to appreciate the maintenance and the not practice of the depredation of the forests (Figure 1 and 2).

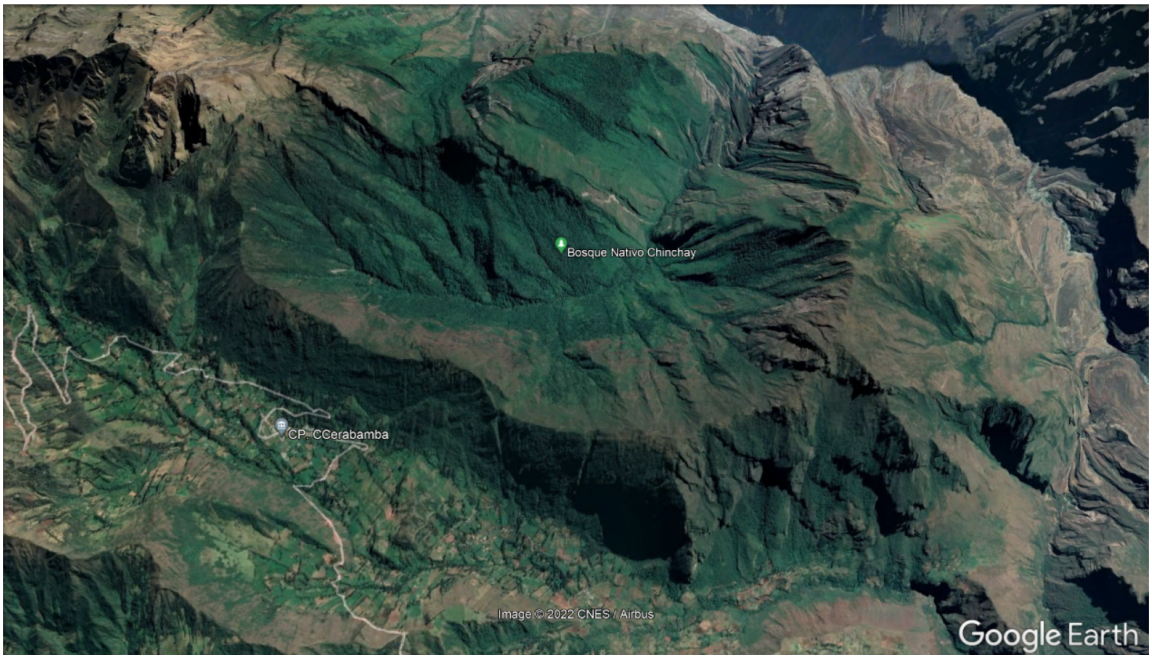

Figure 1: Llaqtapata Inca Trail-Chinchay Forest-Llaqtapata Citadeo. Date Image: 27.05.2020, altitude 2794 masl, eye height 11.71 Km, 13°33′14.54”, 73°05′26.39”

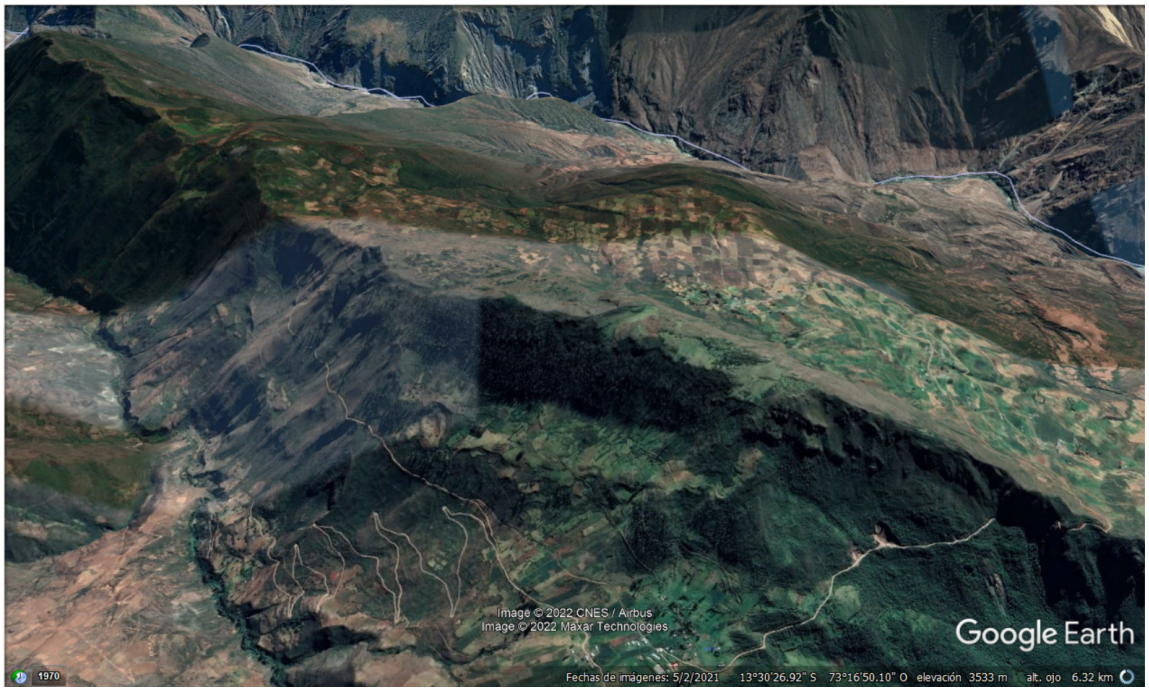

Figure 2: The Timani Circuit. Date Image: 02.05.2021, altitude 3584 masl, eye height 6.32 Km, 13°30′25.60", 73°16′47.69"

Economic Value with Respect to the Surveyed Preference of the Landscape Potential of Ecotourism Resources
For the application of this method, the prices for the transportation service were considered, adding the possibility of complementary services, which strengthen and improve the tourist's experience (Table 1).

Table 1: Travel Costs.

N°	Ecotourism Resources	Price 1 (Single)	Price 2 (Additional)	Price 3 (Additional)
District: Pacobamba				
1	Individual Travel	25.00	40.00	60.00
2	Individual Travel	25.00	40.00	60.00
3	Daily Food	20.00	35.00	35.00
4	Touristic Orientation	20.00	35.00	45.00
Total Maximum Payable		**110.00**	**150.00**	**200.00**
District: Kaquiabamaba				
1	Individual Travel	20.00	30.00	50.00
2	Individual Travel	20.00	30.00	50.00
3	Daily Food	15.00	25.00	25.00
4	Touristic Orientation	15.00	20.00	30.00
Total Maximum Payable		**70.00**	**105.00**	**155.00**

Note: Data obtained from interviewing local tour operators, 2023 and 2024.

Figure 3 shows price trends in ecotourism resources across different districts, Pacobamba and Kaquiabamba. It reports the costs for four key ecotourism services, Individual Travel (1 and 2), Daily Food, and Touristic Orientation—across the three price categories: Price 1 (Single), Price 2 (Additional), and Price 3 (Additional). Each group of bars represents a different service, and the colours indicate the prices that apply in each district. According to the data, traveling to Pacobamba will be more expensive across all categories compared to Kaquiabamba, especially for single travellers and vacationers. A closer analysis at the prices reveals how expenses may vary across the local ecotourism markets, providing insights into access, services provided, or the quality of facilities. Planners, tourists, and researchers in the region will find this data findings valuable for understanding the differences in ecotourism prices.

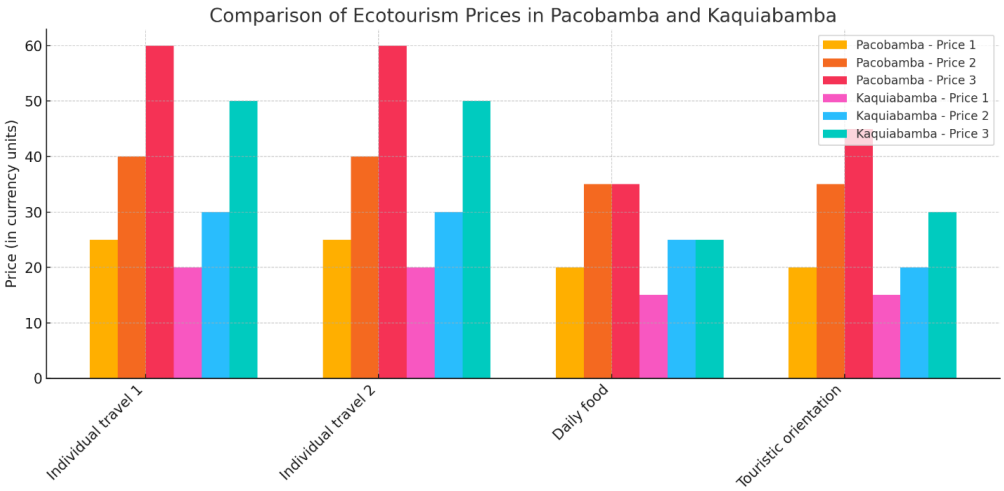

Figure 3: Comparison of Ecotourism Prices in Pacobamba and Kaquiabamba

The costs of the trip, are indicated based on three types of services, the increase is justified by additional services; this allows us to reach what they are willing to pay at most individually, being these: The first service or Price 1, is the standard one, which only includes round trip ticket a passing food and the tourist orientation service (accompaniment, entrance ticket), the transportation service are the direct local means with municipal stops. The second service or additional Price 2, in the regular or premium, which in addition to the previous simple, service, complements with; services of dances or ritual, transport service with specific minor groups with alternative companies. The third service or additional Price 3, is the superior or platinum, which, in addition to the second service, is complemented with: presentation of handicrafts, life experience tour, personalized transportation service (cab) for very small groups, merchandising. Researchers have for each tourist resource, a minimum and a maximum cost to pay, being these:

a) The Inca Trail of Llaqtapata – Chinchay Forest, minimum cost s/. 110.00 pen and maximum of s/. 200.00 pen**.
b) El Mirador and Apu Timani Forest, minimum cost of s/. 70.00 pen and maximum cost of s/. 155.00 pen.

In the case of the Chinchay forest, the cost of the service does not include an internal walk to the interior of the forest indicated, because it is private property, it is the domain of the Pedraza family takes the initiative and starts the enterprise, they could provide another complementary service near the Llaqtapata-Chinchay ecotourism resource.

Economic Value with Respect to the Declared Preference Method of the Landscape Potential of Ecotourism Resources

The data collection was done in local transportation companies, because the frequency of travel to the city of Andahuaylas is considerable for visitors from the cities of Lima, Ica, and Cusco. The base amount to collect information on the willingness to pay was the approximate amount to visit the two resources for three days, whose attributes are known, with a low promotion. The cost does not include round-trip airfare to Lima or Ica or Cusco, nor does it include lodging and foods costs in the city of Andahuaylas. We looked for the maximum and minimum payment with respect to the willingness to pay only to visit and complimentary services in the tourist resource. Dumped the data to Excel and applied major functions such as correlation and multiple regression, can be demonstrated.

Table 2 shows that there is a relationship between the final variable and the reactive or independent variables; for the willingness to pay, which is composed of the direct service of transportation, tourist orientation and ticketing; it is directly related to the origin in 0.41, age in 0.57, monthly expenditure in 0.29; in all of them a medium degree of relationship is determined, giving a positive relationship; which means that "the higher the incidence of origin, age and monthly expenditure capacity, the higher the willingness to pay by the visitors".

Table 2: Degree of Relationship between Willingness To Pay Versus Independent Variables

	Origin	Age	Gender	Education	Monthly Expenses	Amount of Visit
Willing to Pay Without Additional (Total)	0.404456	0.570310	-0.042796	-0.237489	0.290214	-0.231455
Willing to Pay With Additional (Total)	0.210510	0.119576	-0.108407	-0.210180	0.284299	-0.284267

The results of a comparative analysis between individuals' willingness to pay with and without costs and three variables (origin, age, and gender) and three additional variables (education, monthly expenses, and number of visits) are shown in Figure 4. The data indicate that age is most strongly connected to people's willingness to contribute money without receiving something extra, as older individuals tend to pay more. Having a specific origin or higher monthly expenses appears to make individuals more likely to pay for both items. Conversely, both education and visit count show a negative correlation with price willingness, indicating that individuals with higher education levels and more frequent visits are somewhat less likely to want to pay higher prices. The relationship between gender and price willingness is weakly negative, showing little effect. Overall, the chart demonstrates that individuals' willingness to pay varies based on demographic and behavioural factors, depending on whether additional costs are considered.

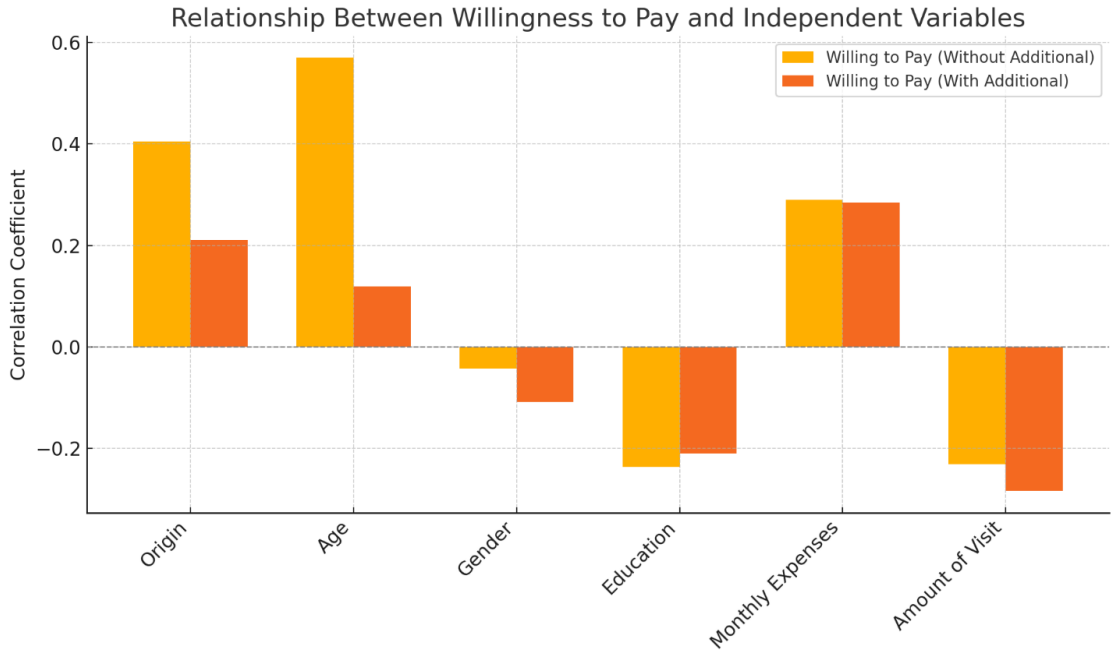

Figure 4: Relationship between Willingness to Pay and Independent Variables

The argument of these results, indicate that, a visitor with higher age and monthly expenditure, presents more inclination for a context, space and moment of experience, landscape, rest, trails; not being so demanding in the provision of the service, it is enough with the minimum or specific, it is not necessarily additional or complementary services. It is complemented by the origin, which is direct, because visitors with urban domicile prefer a visit to these types of little-known resources. However, there are inverse relationships such as the visitor´s education at -0.24 and the reason for the visit at -0.28, which shows a low negative relationship; which means that "the lower the incidence of educational background and the reason for the visit, the higher the willingness to pay for visitors". This result brings us the argument that, a visitor with a higher education, will be more demanding, critical, therefore, will react towards a very simple service, not very pleasant, with gaps in the attention, among others; and the reason for the visit is that the higher education demands that the context of the provided service is fulfilled, more grounded. Peculiar in the correlational results is that the independent variable, there would not exist a relationship of a dimension with the variable Willingness to Pay, then we can confirm that gender has no incidence or significance on the willingness to pay.

Table 3 shows that there is a strong direct relationship of 0.80 between the dependent variable willingness to pay versus origin, age, monthly expenditure, educational background, and reason for the visit; therefore, we can affirm that the independent variables, if related, contribute to form the dependent variable. Likewise, 64% of the pairs of data allow us to form and adjust a prediction and demonstration model of the effect of the independent variables on the variable willingness to pay. Table 4, indicates that there is at least one independent variable that will allow us to form and model the dependent variable called Willingness to Pay, the value of the F test is 0.0025, which shows that the value is les tan 0.005 therefore, there is a model.

Table 3: Degree of Multiple Correlation between Variables

Regression Analysis	
Multiple Correlation Coefficient	0.801211
Coefficient of Determination R^2	0.641939
R^2 Adjusted	0.522585
Standard Error	26.386176
Remarks	25

Table 4: Analysis of Variance

	Degrees of Freedom	**Sum of Squares**	**Mean Squares**	**F**	**Critical Value of F**
Regression	6	22467.85453	3744.6424	5.378453	0.002449
Residues	18	12532.14547	696.2303		
Total	24	35000			

Figure 5 provides anw overview, in a radar chart, of significant results from a regression analysis related to multiple correlations among variables. A strong linear connection exists between the dependent and independent variables with a multiple correlation coefficient of about 0.80. 64% of the changes in the dependent variable are driven by the variables in the model, as indicated by R^2 of about 0.64. With the adjusted R^2 being at 0.52, it rwepresents better accuracy since the number of predictors has been considered. Scaling the standard error can show the common difference between observations and predicted values, and better fits are generally associated with a low standard error. Overall, the chart shows a model that predicts well and to some extent also explains the outcome.

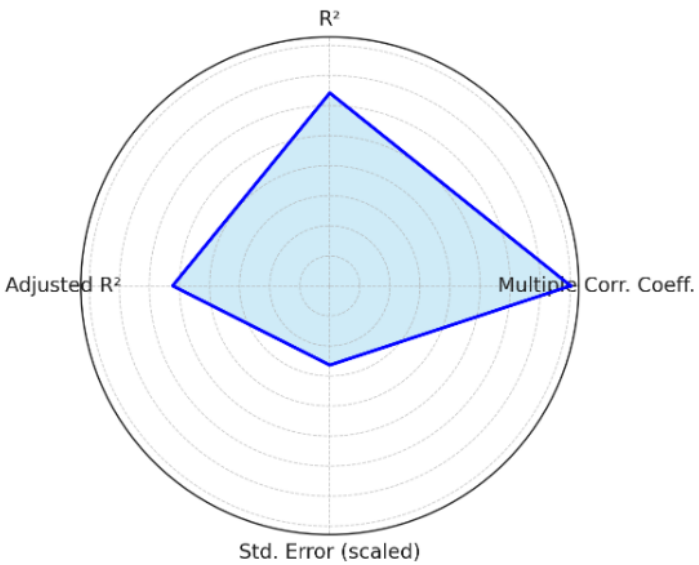

Figure 5: Degree of Multiple Correlation Metrics

Table 5 indicates that there are three independent variables that will allow us to form and model the dependent variable called Willingness to pay, the value of the test indicates the following results: Age with 0.0012, Gender with 0.0199, and monthly expenditure with 0.0044, all these values are les tan 0.005, which shows that there is a model, which can be non-linear, which will allow for greater adjustment and even adequate predictions.

Table 5: Independent Variables Supporting a Willingness-To-Pay Model

	Coefficient	Standard Error	T-Value	Probability	Inferior 95%	Superior 95%
Interception	295.0002	50.227317	5.873302	0000.0142	189.4765	400.5239
Source	2.4964	5.733513	0.435407	0.66844305	-9.5492	14.5420
Age	3.3546	0.869739	3.857118	**0.001154**	1.5274	5.1819
Gender	-30.4586	11.919484	-2.555366	**0.019875**	-55.5005	-5.4167
Education	-5.5198	7.629465	-0.723487	0.478677	-21.5487	10.5090
Monthly Expenditure	0.051139	0.015725	3.252023	**0.004425**	0.0181	0.0841
Reason for the Visit	-9.402251	7.794064	-1.206334937	0.243305	-25.776973	6.9724

In Figure 6, the standard errors for various independent variables as well as their coefficients in the Willingness-To-Pay model are shown. The intercept has a strong influence on the model, as shown by its tall positive coefficient. As the age of the customer increases and monthly expenditure rises, the willingness to pay also increases. In contrast, gender is associated with a large negative influence on WTP in this case. Although education, source, and reason for visit each have a somewhat smaller coefficient, their large standard errors indicate that they do not seem to play a significant role. The presented data demonstrates which variables are most likely to impact the WTP choices.

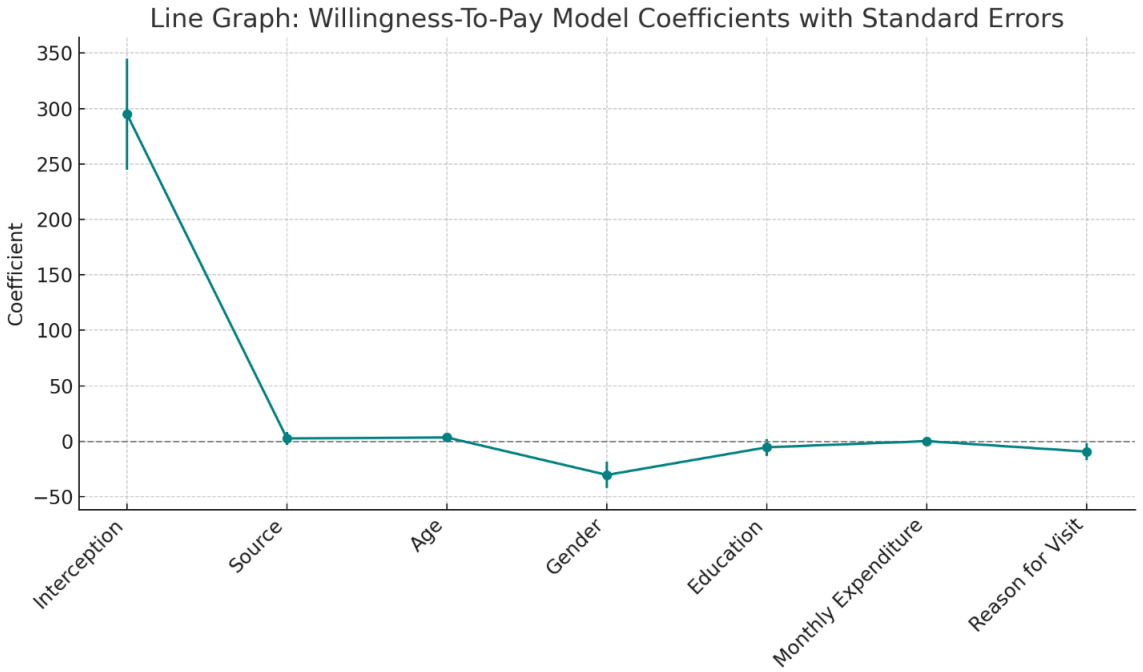

Figure 6: Willingness-To-Pay Model Coefficients with Standard Errors

DISCUSSION

According to the results obtained in the research, the richness of tourist resources of the identified circuits is affirmed, which justifies the economic expenditure per individual, due to the attractions represented by the different geographical spaces reported in the present study, within which different types of tourism can be carried out. According to the general classification, among them highlighting natural tourism or ecotourism, to be able to observe and experience nature, the responsibility of cultural environments to value traditions, adventure evidenced by outdoor activities, discover environments physical-environmental and visit archaeological remains. The creation of a new tourist destination requires investments in promotion, which is generated from the data collected in surveys.

A proposal that incorporates producers and farmers into tourism, that ensures that they put their infrastructure in conditions and train themselves, would be of no use if the demand does not know the product. In this understanding, it is important to know that the tourist destinations allow us to choose each one of them, and by conducting a

survey, being chosen by a public more inclined to discover new destinations and the desire to share adventures with family and friends. Based on this, it is important to indicate that the current tourism trend has although it is true that there are notable tourist destinations at the level of our country, there are those that generate less investment and that are aimed at an audience that has the tendency to visit lesser explored places, in which it can integrate activities such as hiking, bird watching, among others.

More people in the Apurímac region's Andean communities are viewing landscapes as assets that combine ecology, economics, and culture. How communities perceive and understand landscapes is particularly crucial in collective settings. The authors argue that landscape perception is influenced by subjective feelings, impressions, and ways of thinking[17]. The findings of Gajdek*, et al.*[18] in Poland confirm that simplistic top-down planning strategies should be questioned. The results support the inclusion of all stakeholders in Apurímac to contribute to the assessment of how the landscape is valued from all perspectives. Solé*, et al.*[19] show through participatory mapping that local landscape values can be organized and integrated into policy using the IPBES Values Typology model. In Latin America, peri-urban development frequently exerts pressure on rural and communal areas. It is economically necessary to include landscape valorisation in productive activities. Studies suggest that by incorporating biodiversity and ecosystem services into value chains, sustainable development and protection of local identity can be achieved. In Apurímac, it is important to proceed slowly to ensure that everyone retains their rights and shares resources fairly.

According to Santoro[20], preserving traditional rural landscapes is essential for maintaining their resilience and safeguarding cultural heritage. In the Andean highlands, practices such as terracing, cultivation in native forests, and shared grazing support both economic and cultural activities that strengthen community bonds. The appreciation of landscapes in the Apurímac region should be pursued through an interdisciplinary, inclusive, and culturally-based strategy. Global experiences demonstrate that effective landscape planning involves respecting regional traditions, empowering the community, and promoting economic activities that prioritize landscape conservation. The research have demonstrated that the landscape in northern Portugal plays a crucial role in supporting both the environment and the economy of the region while preserving valuable local heritage[21]. This dual use of nature and heritage is particularly significant in the Andean regions, given their rich natural landscapes and indigenous communities.

Landscape managers need to understand and measure the natural capital in an area. Izakovičová*, et al.*[22] pointed out that collecting data at the local level improves landscape valuation, which impacts decision-making in Apurímac. Similarly, Zhang*, et al.*[23] argued that landscape qualities must be taken into account in appraising sites. They argued that mapping these traits among well-known Peruvian Andean peaks can support conservation and heritage celebration. To achieve sustainability, local people's views on ecosystem services matter a lot. According to Acharya*, et al.*[24], WTP for cultural and regulatory services is different among users, which proves the importance of addressing social variety in valuation processes. The recognition of this insight goes along with the fact that people in Apurímac see their landscape in both economic and spiritual ways. Doing this in Apurímac could make use of what is available while helping to preserve highland ecology.

Landscape valorisation can also be aided by technological tools[25]. The study demonstrates that geospatial applications assist in preserving cultural itineraries that can help map important places and routes in Apurímac, making them more visible and easier to protect. Tourism has two sides: it may either protect nature or damage it. Dax, and Tamme[26] described how certain parts of the landscape encourage sustainable tourism in mountain areas, requiring highlighted activities that maintain their authenticity. As a result of this, Sobhani*, et al.*[27] gave guidance on estimating ecotourism carrying capacity, which may be used to manage tourism in sensitive regions of the Andes. There are similar government issues for marine and terrestrial ecotourism. Casimiro*, et al.*[28] suggested that ecotourism in protected areas can be useful for understanding natural capital and strengthening leadership in those regions, making their ideas applicable to Apurímac's mountain commons. The concept of spatial planning modelled by ecosystem services has been emphasized by Hou, and Dai[29] to support local planners in Peru to integrate ecological care with developing local resources.

To achieve sustainable development and improve our landscapes in the Apurímac region, it helps to use a broad range of experiences drawn from different disciplines. Ecotourism based in communities is still considered a key way to

help preserve the environment, aid recovery after conflicts, and revive culture. In this case, Woldu[30] believes that ecotourism in Ethiopia wand Eritrea played a key role in bringing formerly warring communities back together, creating a strong community feeling, and strengthening the economy. This example is valuable for Peru after the pandemic and its efforts to help indigenous groups. Those responsible should always aim to balance tourism in areas that are not ecologically damaged. The fidnings of Grindsted*, et al.*[31] reveals that landscape disagreements can arise in nature parks if organizations do not have the same objectives. This observation aligns with the challenges currently faced in Apurímac, where development initiatives often coexist uneasily with traditional practices of land stewardship and environmental care. What these findings show matches ongoing difficulties in Apurímac, where development projects can awkwardly coexist with traditional care for land and the environment. Additionally, pioneering methods used by Pham*, et al.*[32] demonstrate how bringing stakeholders on board, using GIS, and modelling are valuable in mapping the impacts of ecotourism on a community. Their experience in the Vietnamese Moc Chau region guides similar ecosystem assessments in the Andes from a participatory perspective, helping ensure that all three aspects of cultural, ecological, and spiritual values of the territory are recognized. These insights underscore the need for community-led strategies that balance conservation, heritage, and development. Inclusive planning and sustainable ecotourism can position Apurímac as a model for resilient and culturally respectful growth.

LIMITATIONS

This study provides valuable insights, but they need to be tempered by several limitations. Firstly, the research was primarily based on qualitative and semi-quantitative assessments, grounding the results heavily within a cultural context that may limit their generalizability to other Andean or Latin societies with different socio-ecological dynamics. The subjectivity of participatory methods was also shown to influence assessments of landscape resource valuation, which can be influenced by the composition, background, and expectations of stakeholder groups participating in them. Additionally, due to logistical constraints and limited accessibility to remote communal territories, the geography of the fieldwork was restricted. This potentially excluded areas with unique landscape features or cultural values that could provide additional information for understanding the landscape functions in the region. Furthermore, as the study involves multiple value dimensions (cultural, ecological, and economic), it does not deeply involve quantitative ecosystem service models (e.g., InVEST, ARIES) to support the precision of the valuation efforts. GIS-based spatial analysis was only integrated preliminarily, and land use scenarios and long-term impacts of development or conservation policies were not fully mapped out in comparison to each other.

FUTURE RESEARCH DIRECTIONS

Future research should aim to develop hybrid valuation models that integrate qualitative community insights with quantitative ecosystem service modelling tools to produce more holistic and scalable results. The incorporation of remote sensing and high-resolution GIS mapping can further enhance spatial understanding of landscape values and dynamics across larger areas of the Apurímac region. There is also significant potential in conducting longitudinal studies to monitor changes in perceived and actual landscape value over time, especially as development pressures, tourism flows, and climate change continue to reshape the region. Expanding research to cross-regional comparisons with other Andean territories or indigenous-managed landscapes in Latin America could offer valuable comparative insights. Finally, future studies should explore policy implications and governance frameworks more deeply, particularly how indigenous governance systems can be effectively integrated into national or international conservation and development agendas. Strengthening community-led research and capacity-building initiatives will be essential for ensuring that landscape valorisation remains grounded in local knowledge, agency, and long-term sustainability.

IMPLICATIONS

This study reinforces that landscape valuation must extend beyond aesthetics to include community-defined values and practical economic benefits. By identifying ecotourism willingness-to-pay thresholds, local authorities can calibrate service pricing and infrastructure investment more effectively. The positive correlation between visitor age and spending preference suggests market opportunities in senior and culturally-inclined ecotourism demographics. Revealed and stated preference methods offer complementary insights; their combined use strengthens policy planning and financial forecasting. Tourism development must balance environmental capacity with economic ambition; this study offers a valuation-based framework to guide such trade-offs. Findings support the creation

of differentiated tourism packages (basic, premium, cultural-immersion) to maximize consumer surplus across visitor segments. Insights into visitor origin and expenditure patterns enable destination branding strategies aligned with target demographics (e.g., Lima or Cusco-based tourists). Integration of GIS and satellite imagery can inform zoning, land-use planning, and conservation prioritization at a district scale. The empirical link between landscape valuation and community entrepreneurship supports rural livelihoods through eco-enterprises and artisan networks. By recognizing ecotourism as both a service and a cultural expression, planners can preserve intangible heritage while stimulating economic activity. Gender and education effects on willingness to pay reveal subtle social dynamics that must be considered in promotional messaging and service quality. Policymakers can use these data to justify eco-infrastructure funding, including sustainable trails, signage, waste systems, and mobility access. Capacity building among community guides and stakeholders remains crucial; valuation evidence can direct training priorities. Ultimately, the study contributes to a deeper understanding of how natural capital, when fairly valued and managed, can enhance resilience in marginalized rural regions.

CONCLUSION

Two ecotourism routes with landscape potential were identified as part of the ecotourism resources of the peasant communities in the province of Andahuaylas: a) Llaqtapata Inca Trail-Chinchay Forest-Ciudadela Llaqtapata, and b) El Timani circuit. The revealed preference for the use of these routes showed that the first route, "The Inca Trail of Llaqtapata-Chinchay Forest," had an estimated maximum value for complementary services of S/200.00 pen. The second route, "El Apu and Bosque Timani," had a maximum value for complementary services of S/155.00 pen. In terms of declared or indirect preference for the use of ecotourism resources, the first resource, "Bosque y Mirador Apu Timani," had a willingness to pay of S/90.00 pen without additional services and S/150.00 pen with additional services. For the ecotourism resource "Llaqtapata Inca Trail-Chinchay Forest-Ciudadela Llaqtapata," a similar result was obtained with a minimum DAP of S/100.00 pen and a maximum of S/160.00 pen with additional services. The maximum individual total economic value of the ecotourism route in Pacobamba is S/360.00 pen, and the ecotourism route in the Kaquiabamba district is S/305.00 pen.

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