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ECOTOURISM, SOCIAL INEQUALITY, AND PERCEPTUAL GAPS: A STUDY OF CONSERVATION AND LOCAL ECONOMIC DEVELOPMENT AT DLUNDUNG WATERFALL

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Abstrak

Penelitian ini bertujuan untuk menganalisis pengaruh potensi ekowisata Air Terjun Dlundung terhadap konservasi alam dan pengembangan ekonomi lokal di Desa Ketapanrame, Trawas, Mojokerto. Penelitian menggunakan pendekatan kuantitatif dengan desain asosiatif dan teknik quota sampling yang melibatkan 60 masyarakat lokal dan 40 wisatawan. Data dikumpulkan melalui kuesioner dan dianalisis menggunakan regresi linear sederhana, uji t, uji F, dan koefisien determinasi. Hasil penelitian menunjukkan bahwa potensi ekowisata berpengaruh positif dan signifikan terhadap konservasi alam menurut masyarakat ($R^2 = 0,333$; $F = 18,971$) maupun wisatawan ($R^2 = 0,358$; $F = 32,336$). Namun, potensi ekowisata tidak berpengaruh signifikan terhadap pengembangan ekonomi lokal menurut masyarakat ($R^2 = 0,040$; $F = 1,571$), sedangkan wisatawan mempersepsikan adanya pengaruh yang signifikan meskipun lemah ($R^2 = 0,067$; $F = 4,198$). Temuan ini menunjukkan adanya kesenjangan persepsi yang terkonfirmasi secara statistik (Fisher's $z = -2,21$; $p = ,027$), mencerminkan ketimpangan distribusi manfaat ekonomi. Penelitian ini menyimpulkan bahwa keberhasilan ekowisata tidak hanya diukur dari konservasi lingkungan, tetapi juga dari keadilan manfaat ekonomi bagi masyarakat lokal. Secara praktis, temuan ini merekomendasikan agar pengelolaan ekowisata Air Terjun Dlundung beralih menuju model ko-manajemen berbasis komunitas: Perum Perhutani dan Pemerintah Desa Ketapanrame perlu membentuk mekanisme pengelolaan bersama yang memperluas peran masyarakat dari sekadar tenaga kerja menjadi mitra dalam bagi hasil, perizinan usaha, dan pengambilan keputusan, sehingga manfaat ekonomi yang sudah terlihat oleh wisatawan dapat dirasakan secara nyata oleh warga lokal.

Kata Kunci: potensi ekowisata, kesenjangan persepsi, ketimpangan ekonomi, partisipasi masyarakat, ilmu sosial

Abstract

This study aims to analyze the influence of ecotourism potential at Dlundung Waterfall on nature conservation and local economic development in Ketapanrame Village, Trawas, Mojokerto. A quantitative associative approach was employed using quota sampling, involving 60 local residents and 40 tourists. Data were collected through questionnaires and analyzed using simple linear regression, t-test, F-test, and coefficient of determination. The results indicate that ecotourism potential has a significant positive effect on nature conservation according to both residents ($R^2 = 0.333$; $F = 18.971$) and tourists ($R^2 = 0.358$; $F =$

32.336). However, ecotourism potential does not significantly affect local economic development based on residents' perception ($R^2 = 0.040$; $F = 1.571$), while tourists perceive a significant but weak relationship ($R^2 = 0.067$; $F = 4.198$). These findings reveal a statistically confirmed perceptual gap (Fisher's $z = -2.21$, $p = .027$) indicating unequal distribution of economic benefits. This study concludes that ecotourism success should be measured not only by environmental outcomes but also by equitable economic benefits for local communities. Practically, these findings suggest that the management of Dlundung Waterfall ecotourism needs to shift toward a more participatory model: Perum Perhutani and the Ketapanrame Village Government should establish a formal community co-management mechanism that expands residents' roles beyond labor into profit-sharing, business licensing, and joint decision-making, so that the economic gains already visible to tourists are also meaningfully experienced by the local community.

Keywords: ecotourism potential, perceptual gap, economic inequality, community participation, social science

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INTRODUCTION

The development of ecotourism has emerged as a globally significant strategy for integrating environmental conservation with the sustainable improvement of local community welfare. Conceptually, ecotourism is defined as a form of responsible, nature-based tourism that is oriented not merely toward the preservation of ecosystems, but also toward the enhancement of local communities' livelihoods through participatory and sustainability-oriented approaches (Longginus et al., 2025; Tarukallo, 2025). Within the framework of sustainable development, ecotourism is expected to simultaneously balance ecological, economic, and social dimensions in a proportionate manner. Nevertheless, a substantial body of empirical research indicates that the implementation of ecotourism in developing countries, including Indonesia, continues to face considerable challenges in achieving this equilibrium.

A structural problem that frequently arises is the disparity between environmental conservation efforts and the equitable distribution of economic benefits. On one hand, the increasing influx of tourists stimulates economic growth within tourism areas; on the other hand, such conditions often generate significant ecological pressure while failing to ensure an equitable distribution of benefits among local communities. Research conducted across various nature-based tourism destinations reveals that low levels of community participation in management processes, coupled with inadequate environmental management systems—particularly with respect to solid waste management—constitute determinant factors impeding the sustainability of ecotourism (Bhuiyan et al., 2024; Li et al., 2025; Madya et al., 2025). These findings suggest that the success of ecotourism cannot be measured solely by visitor volume, but must also encompass the quality of governance and the degree of local community engagement.

From an economic-institutional perspective, the concept of Community-Based Tourism (CBT) underscores that the long-term sustainability of ecotourism is

fundamentally contingent upon the extent to which local communities actively participate in management processes and receive proportional and equitable economic benefits (Al Azzam, 2025; Jackson, 2025). Although several studies have documented ecotourism's capacity to improve community income, the distribution of such benefits tends to be uneven as a consequence of centralized management models and limited community access to available economic opportunities (Bir et al., 2024). This reality reinforces the argument that, in the absence of genuine community participation, ecotourism risks generating economic marginalization and social exclusion at the local level.

Comparative international studies similarly reveal a consistent pattern: low levels of community participation result in an inequitable distribution of economic benefits, whereas community-based management models have demonstrably proven capable of improving community welfare inclusively while simultaneously maintaining environmental integrity (Jackson, 2025; Tarukallo, 2025). Accordingly, community participation constitutes a key variable in determining ecotourism success, both in terms of ecological conservation and local economic empowerment.

Within a local research context, analogous phenomena are observable at the Dlundung Waterfall tourism area, situated on the slopes of Mount Welirang in Ketapanrame Village, Trawas District, Mojokerto Regency. This area possesses considerable ecotourism potential, as evidenced by its distinctive natural landscape, rich biodiversity, and relatively adequate accessibility. However, the management structure, which operates under the authority of Perum Perhutani, tends to be centralistic in nature, resulting in limited involvement of local communities in decision-making processes and tourism management. This condition has contributed to a suboptimal distribution of economic benefits for surrounding communities, as well as the persistence of environmental challenges—particularly inadequate solid waste management during peak visitation periods. Furthermore, prior research conducted in this area has predominantly focused on biodiversity or visitor satisfaction in isolation, without comprehensively examining the interrelationships among ecotourism potential, environmental conservation, and local economic empowerment within a unified analytical framework.

Based on the foregoing, a critical research gap is identified: the scarcity of studies that simultaneously examine the influence of ecotourism potential on natural conservation and local economic development, while comparatively analyzing the perceptions of local communities and tourists as two primary actors within the ecotourism system. Differences in perception between these two groups of actors have the potential to yield a more comprehensive and representative understanding of ecotourism governance effectiveness and the resulting distribution of benefits.

In light of these considerations, this study aims to analyze the level of ecotourism potential at the Dlundung Waterfall area and to examine its influence on natural conservation and the local economic development of Ketapanrame Village. Additionally, this study seeks to identify and analyze differences in perception between local communities and tourists regarding the relationships among ecotourism potential,

environmental conservation, and local economic development. Theoretically, this research is expected to contribute to the development of a community participation-based sustainable ecotourism model; practically, its findings are intended to serve as an empirical foundation for area managers and village governments in formulating policies that are more inclusive, participatory, and sustainability-oriented.

LITERATURE REVIEW

This research is grounded in Sustainable Development Theory, which provides a conceptual framework for understanding the balance between environmental conservation and economic development within ecotourism management. Introduced by WCED (1987), the theory emphasizes the fulfillment of present needs without compromising the ability of future generations to meet their own needs, through the integration of environmental, economic, and social dimensions. In the context of the present study, these three pillars map directly onto the research variables: the environmental dimension is operationalized as nature conservation (Y1), the economic dimension as local economic development (Y2), and ecotourism potential (X) serves as the integrative driver that is theoretically expected to advance both dimensions simultaneously. A central premise of this theory is that the environmental and economic pillars should be co-advanced through sustainable governance; however, this equilibrium is not assumed to occur automatically and requires deliberate institutional intervention to align tourism development with equitable community outcomes. These principles align with the concept of ecotourism as a form of responsible nature-based tourism that promotes environmental preservation while enhancing the welfare of local communities through participatory and sustainable approaches (TIES Announces Ecotourism Principles Revision, 2015). Within this framework, ecotourism potential is positioned as a key variable influencing both environmental conservation and local economic development as representations of the core pillars of sustainable development.

Theoretical perspectives on natural resource conservation highlight the importance of responsible management in maintaining ecosystem sustainability (Ndubuis et al., 2025; Titisari & Zahra, 2025). Ecotourism contributes to conservation efforts by fostering environmental awareness, supporting habitat protection, and encouraging sustainable resource utilization (Pereira et al., 2024; Satrya et al., 2023). A positive relationship is therefore expected between ecotourism potential and conservation outcomes, as areas with higher ecological value tend to receive greater attention in protection and management practices. However, the strength of this relationship is highly dependent on governance quality and the level of community involvement in conservation activities.

Economic perspectives on tourism emphasize its capacity to generate direct, indirect, and induced impacts on local economies. Despite these potential benefits, unequal distribution often arises due to centralized management structures that limit community access to economic opportunities. The Community-Based Tourism (CBT) approach addresses this issue by advocating for active local participation in tourism

planning and management to ensure more equitable benefit distribution (Abdurrahman et al., 2025; Abebe, 2023; Van Huy, 2021). Ecotourism potential, therefore, functions not only as a tourism asset but also as a source of economic opportunity that must be managed inclusively to support sustainable local economic development.

Social dimensions are further examined through differences in perception between local communities and tourists. Attribution Theory explains that individuals interpret and evaluate situations differently based on their experiences and level of involvement (Yodsurang et al., 2022). Tourists, whose engagement is typically short-term, tend to form more favorable perceptions, whereas local communities, who experience long-term impacts, often develop more critical and comprehensive evaluations. These differences are closely linked to the level of community participation in tourism management. Arnstein's (1969) ladder of citizen participation illustrates that higher levels of participation enable greater control over decision-making processes and improve access to economic benefits, thereby influencing perceptions of ecotourism outcomes (Arnstein, 1969).

Previous studies indicate that the success of ecotourism is shaped by the interaction between natural resource potential, community participation, environmental awareness, and the equitable distribution of economic benefits. Recent research demonstrates that community participation and environmental awareness significantly influence ecotourism sustainability, although challenges related to infrastructure and local capacity remain (Aji Prabowo et al., 2025; Sari et al., 2025). Other studies reveal that economic benefits derived from ecotourism are often unevenly distributed due to weak governance and limited community involvement (Kia, 2021; Muda, 2025). Community-Based Tourism theory predicts that when communities participate substantively—securing roles in planning, licensing, and revenue-sharing rather than only in low-wage operational tasks—the correlation between tourism potential and economic development should be positive and robust. Conversely, when participation remains peripheral and governance remains centralized, the economic benefits of tourism are unlikely to be equitably distributed among local residents. Attribution Theory further provides a theoretical basis for anticipating perceptual differences between stakeholder groups: residents, who are continuously exposed to the social and economic realities of tourism, tend to form attributions grounded in lived experience, whereas tourists—whose contact with the site is typically brief and observational—may evaluate tourism impacts based on surface-level impressions rather than structural conditions (Saleh, 2022). Similarly, Arnstein's (1969) ladder of participation provides a structural framework for assessing the quality of community involvement: only when communities reach the higher rungs—partnership, delegated power, or citizen control—does benefit distribution become genuinely equitable. A clear research gap persists in the limited number of studies that simultaneously examine the influence of ecotourism potential on both environmental conservation and local economic development while also comparing perceptions between local communities and tourists within a unified analytical framework. Addressing this gap, the present research integrates these dimensions in the context of the Dlundung Waterfall ecotourism area (Arnstein, 1969; Varwell, 2022).

METHOD

The research subjects consisted of two groups, namely local residents of Ketapanrame Village aged at least 17 years and tourists visiting Dlundung Waterfall. A total of 100 respondents were involved, comprising 60 local residents and 40 tourists. The sampling technique used was non-probability sampling with a quota sampling method to ensure proportional representation of both groups (Moser & Stuart, 1953; Sedgwick, 2012). The decision to set the total sample at 100 respondents, divided into 60 local residents and 40 tourists, was guided by both contextual and statistical considerations. Quota sampling, rather than probability sampling, was adopted because no complete and continuously updated population list was available for either group: the resident population is subject to ongoing demographic turnover, while the tourist population fluctuates daily and is not formally registered, making random sampling impractical within the available data collection period. This approach allowed the composition of the two comparison groups to be controlled in advance while remaining feasible under field conditions, consistent with established quota sampling practice in social and tourism research (Moser & Stuart, 1953; Sedgwick, 2012). The 60:40 proportion was set deliberately rather than arbitrarily. Local residents, who experience the long-term ecological and socio-economic consequences of ecotourism management and therefore constitute the primary stakeholder group for policy purposes, were allocated a larger quota, while tourists, whose engagement with the site is comparatively short-term, were allocated a smaller but still adequate quota to enable a meaningful between-group comparison. In addition, both subsample sizes exceed the minimum of 30 cases per group conventionally required for simple linear regression analysis to approximate a normal sampling distribution and to provide sufficient statistical power, ensuring that the separate regression models estimated for each group were statistically defensible.

Data were collected using a structured questionnaire developed based on three research variables: ecotourism potential (tourist attraction, facilities, accessibility, tourism activities, and environmental education), nature conservation (environmental cleanliness, waste management, forest conservation, water management, and environmental awareness), and local economic development (community income, business opportunities, employment, and welfare). The questionnaire consisted of 26 items measured using a five-point Likert scale. Two versions of the questionnaire were administered to reflect the perspectives of local residents and tourists. Prior to data collection, the instrument was tested and met the required validity and reliability criteria. Field observation and documentation were also conducted to support the primary data.

Data analysis was carried out in three stages. First, descriptive statistical analysis was used to present the characteristics of each variable for both respondent groups, including minimum, maximum, mean, and standard deviation values. Second, simple linear regression analysis was applied to examine the effect of ecotourism potential on nature conservation and local economic development, conducted separately for local residents and tourists. Third, the results of the regression models were compared to

identify differences in perceptions between the two groups. Rather than relying on a purely descriptive comparison of the regression outputs, the correlation coefficients (r) underlying each group-specific regression model were compared using Fisher's r -to- z transformation test for independent samples (Santoso, 2018). This procedure converts each correlation coefficient into a normally distributed z -score and tests the null hypothesis that the two correlations are equal ($H_0: r_{\text{residents}} = r_{\text{tourists}}$), thereby providing a formal statistical basis for identifying significant differences in perception between the two groups. All statistical analyses were performed using statistical software.

The regression models used in this study are as follows:

$$Y_1 = a + bX$$

$$Y_2 = a + bX$$

Where:

Y_1 = nature conservation

Y_2 = local economic development

a = constant

b = regression coefficient

X = ecotourism potential

Through these procedures and analytical techniques, this study aims to provide an empirical understanding of the relationship between ecotourism potential and both nature conservation and local economic development, as well as to identify differences in perception between local residents and tourists.

RESULT AND DISCUSSION

The study involved 60 local residents and 40 tourists as respondents. Data were analyzed using descriptive and inferential statistics, and the findings are presented sequentially based on the research objectives. Prior to the main analysis, the research instrument was tested to ensure its validity and reliability. The validity test results indicate that all statement items across the variables of ecotourism potential (X), nature conservation (Y_1), and local economic development (Y_2) are valid for both respondent groups. For the tourist group, all calculated r -values exceed the r -table value of 0.3160, while for the resident group, all calculated r -values exceed the r -table value of 0.2542. These results confirm that each item is capable of accurately measuring the intended constructs.

Table 1. Reliability Test Results

Variable	Residents (n=60)	Tourists (n=40)	Remarks
<i>Ecotourism Potential (X)</i>	0.899	0.886	Reliable ($\alpha > 0.70$)
<i>Nature Conservation (Y1)</i>	0.865	0.927	Reliable ($\alpha > 0.70$)

Local Economic Development (Y2)	0.969	0.933	Reliable ($\alpha > 0.70$)
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Source: Primary data, processed 2026

All questionnaire items met the required validity and reliability criteria, indicating that the instrument was appropriate for further statistical analysis (Ghozali, 2018). This confirms that the data collected are suitable for examining the relationships between variables.

Descriptive statistical analysis was conducted to examine the distribution of responses for each variable across both respondent groups.

Table 2. Descriptive Statistics of Research Variables

VARIABLE	GROUP	N	MINIMUM	MAXIMUM	MEAN	STD. DEVIATION
X1	Local Residents	60	30.00	60.00	50.38	6.56
Y1	Local Residents	60	34.00	50.00	43.20	4.31
Y2	Local Residents	60	12.00	45.00	34.95	7.53
X1	Tourists	40	23.00	53.00	33.58	8.14
Y1	Tourists	40	24.00	45.00	33.72	4.60
Y2	Tourists	40	26.00	58.00	41.88	7.84

Source: Primary data, processed 2026

The level of ecotourism potential at Dlundung Waterfall is perceived differently by the two respondent groups. Local residents reported a high level of ecotourism potential, with a mean score of 50.38 out of a maximum of 60 and a standard deviation of 6.56, indicating moderate variation in responses. In contrast, tourists rated the ecotourism potential at a moderate level, with a mean score of 33.58 out of 53 and a higher standard deviation of 8.14, suggesting greater variability in perception. This difference indicates that residents tend to have a more optimistic and consistent assessment compared to tourists, whose evaluations are influenced by short-term experiences and expectations. Such variation reflects differences in exposure and familiarity with the tourism environment, as also noted in previous studies on visitor perception in ecotourism contexts (Longginus et al., 2025; Madya et al., 2025).

Inferential analysis using simple linear regression was conducted to examine the relationship between ecotourism potential and the dependent variables.

Table 3. Regression Test Results (t-test, F-test, R^2)

GROUP	RELATIONSHIP	R^2	T-VALUE	F-VALUE	SIGNIFICANCE
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RESIDENTS	X → Y1	0.333	4.356	18.971	Significant (p < 0.05)
RESIDENTS	X → Y2	0.040	-1.253	1.571	Not significant (p > 0.05)
TOURISTS	X → Y1	0.358	5.687	32.336	Significant (p < 0.05)
TOURISTS	X → Y2	0.067	2.049	4.198	Significant (p < 0.05)

The relationship between ecotourism potential and nature conservation shows consistent and statistically significant results for both groups. For local residents, the coefficient of determination (R^2) is 0.333 with an F-value of 18.971 ($p < 0.05$), while for tourists, the R^2 value is slightly higher at 0.358 with an F-value of 32.336 ($p < 0.05$). These findings indicate that ecotourism potential explains approximately one-third of the variation in conservation outcomes. This suggests that improvements in ecotourism components—such as tourist attractions, facilities, accessibility, tourism activities, and environmental education—are closely associated with better conservation practices. This finding supports the theoretical perspective that ecotourism contributes directly to environmental preservation (Bhuiyan et al., 2024; TIES Announces Ecotourism Principles Revision, 2015).

Community involvement emerges as an important factor in explaining these results. Previous studies emphasize that local participation plays a crucial role in maintaining environmental sustainability. The relatively strong relationship identified in this study suggests that conservation outcomes are influenced not only by formal management systems but also by community awareness and engagement. However, the slightly higher perception among tourists indicates a difference in perspective, where tourists tend to evaluate environmental conditions more positively due to their temporary experience, while residents are more critical because of their continuous interaction with the environment. This difference aligns with attribution theory, which explains how individuals interpret experiences based on their level of involvement and duration of exposure (Aji Prabowo et al., 2025; Satrya et al., 2023).

A contrasting pattern emerges in the relationship between ecotourism potential and local economic development. For local residents, the relationship is not statistically significant ($R^2 = 0.040$; $p > 0.05$), with a negative regression coefficient, indicating that ecotourism potential does not meaningfully contribute to perceived improvements in income, employment, business opportunities, or overall welfare. The very low explanatory power suggests that economic benefits from tourism are minimal or unevenly distributed among the community. This finding indicates that the presence of tourism activities has not been able to generate substantial economic advantages for most local residents.

This condition reflects the limited implementation of Community Based Tourism (CBT), where local communities are expected to play an active role and receive direct economic benefits (Abdurrahman et al., 2025). In practice, however, economic benefits tend to be concentrated among a narrow group of actors with privileged access to the management authority, while the broader community remains marginally involved and economically peripheral. This constitutes a structural form of social inequality embedded in the governance architecture of the site: because Perum Perhutani retains concession authority over formal commercial activities within the tourism zone, local residents are effectively excluded from the most profitable segments of the value chain—formal retail, catering, guided tours—and are instead confined to informal, low-return activities outside the fee-collection perimeter. The quantitative signature of this inequality is visible in the data: the near-zero and negative regression coefficient between ecotourism potential and economic development for residents ($b = -0.229$; $R^2 = 0.040$) indicates that as ecotourism potential increases, residents' perceived economic development does not improve and may even slightly worsen—consistent with a displacement effect in which growing tourist flows increase land and labor costs without proportionally increasing community income. This pattern of benefit exclusion is not unique to Dlundung: centralized management structures in other Indonesian ecotourism sites have similarly been documented to restrict community access to tourism resources, limiting participation in decision-making and concentrating revenues among institutional managers and a small local elite (Kia, 2021; Muda, 2025). The social inequality identified here is therefore not incidental but structural, rooted in property rights, concession arrangements, and governance hierarchies that systematically favor the managing institution over resident communities. Addressing this inequality requires not merely technical improvements to tourism services, but substantive redistribution of economic rights and decision-making authority. Similar findings have been reported in previous studies showing that unequal benefit distribution and limited community involvement remain persistent challenges in ecotourism development (Kia, 2021; Muda, 2025).

In contrast, tourists perceive a statistically significant relationship between ecotourism potential and local economic development ($R^2 = 0.067$; $p < 0.05$), although the strength of the relationship remains weak. Tourists tend to observe visible economic activities, such as small businesses and services, and assume that these contribute to community welfare. However, this perception does not necessarily reflect the actual distribution of economic benefits experienced by local communities.

The difference between residents' and tourists' perceptions reveals a perceptual gap that serves as a key finding of this study. This gap indicates that external evaluations of tourism success may overestimate its real socio-economic impact. Residents experience limited improvements in their livelihoods, while tourists form conclusions based on surface-level observations. Such discrepancies highlight the importance of incorporating local perspectives in evaluating the effectiveness of ecotourism development.

To determine whether this descriptive gap reflects a statistically meaningful difference rather than ordinary sampling variation, Fisher's r -to- z transformation test

was applied to compare the correlation coefficients underlying the two group-specific regression models, for both the conservation and the economic development relationships (Table 4).

Table 4. Fisher's r-to-z Test for Differences in Perception between Residents and Tourists

Variable	Residents (n=60)	Tourists (n=40)	Z	P	Interpretation
X → Y1 (<i>Nature Conservation</i>)	0.577	0.598	-0.15	.878	Not significant (no perceptual gap)
X → Y2 (<i>Local Economic Development</i>)	-0.200	0.259	-2.21	.027	Significant (perceptual gap confirmed)

Source: Computed from the regression results in Table 3, using $r = \pm\sqrt{R^2}$ (sign taken from the corresponding t-value) and Fisher's r-to-z transformation

The test confirms that the relationship between ecotourism potential and nature conservation does not differ significantly between residents and tourists ($z = -0.15$, $p = .878$), supporting the earlier descriptive observation that both groups hold a consistent positive perception of ecotourism's contribution to conservation. In contrast, the relationship between ecotourism potential and local economic development differs significantly between the two groups ($z = -2.21$, $p = .027$). This result provides formal statistical confirmation that the perceptual gap identified descriptively above is unlikely to be attributable to sampling variation, and instead reflects a substantively different evaluation of ecotourism's economic benefits between residents and tourists. The existence of this gap can be explained by several structural factors, including centralized management, limited community participation, and unequal distribution of economic benefits. Community involvement is generally restricted to small-scale operational roles without meaningful participation in planning or policy-making processes. As a result, only a small portion of the community benefits directly from tourism activities, while the majority experiences little to no economic improvement. This condition reflects a low level of participation, where communities have limited control over tourism development, as described in Arnstein's ladder of participation (Arnstein, 1969).

These findings challenge classical tourism economic impact theories, which assume that tourism growth automatically leads to improved community welfare. Instead, the results suggest that the relationship between ecotourism potential and local economic development is highly dependent on governance structures and the level of community participation. Similar patterns have been identified in both national and international studies, which emphasize that without inclusive and participatory management, ecotourism is unlikely to achieve equitable economic outcomes.

Overall, the findings indicate that ecotourism at Dlundung Waterfall has been relatively successful in supporting environmental conservation but has not yet achieved

equitable economic outcomes. This imbalance suggests that the success of ecotourism should not be evaluated solely based on environmental indicators or visitor numbers, but also on the extent to which local communities receive direct and fair economic benefits. Strengthening participatory governance and improving the distribution of economic benefits are therefore essential to achieving sustainable and inclusive ecotourism development.

From a broader perspective, these findings highlight the importance of strengthening community-based management approaches to ensure that ecotourism contributes not only to environmental sustainability but also to social equity. In the context of Social Studies (IPS), the case of Dlundung Waterfall provides a relevant empirical illustration of the interaction between environmental sustainability, economic development, and social justice. The identified perceptual gap reflects real-world inequalities that can be used as a contextual learning resource. Through place-based learning approaches, students can analyze the interaction between humans and the environment, understand tourism-driven economic dynamics, and critically evaluate issues of sustainability and equity. This supports the development of critical thinking, social awareness, and problem-solving skills, which are central to Social Studies education.

CONCLUSION

This study produces three principal conclusions. First, ecotourism potential at Dlundung Waterfall has a significant positive effect on nature conservation according to both local residents ($R^2 = 0.333$; $F = 18.971$) and tourists ($R^2 = 0.358$; $F = 32.336$), and these two groups do not differ significantly in this regard (Fisher's $z = -0.15$; $p = .878$). This finding is consistent with Sustainable Development Theory's expectation that ecotourism contributes to the environmental pillar of sustainability, and with ecotourism conservation literature more broadly. Second, ecotourism potential does not significantly affect local economic development as perceived by residents ($R^2 = 0.040$; $p > .05$), while tourists perceive a weak but significant positive effect ($R^2 = 0.067$; $p < .05$). The formal Fisher's r -to- z test confirms that this perceptual gap is statistically significant ($z = -2.21$; $p = .027$), meaning the two groups hold genuinely different assessments of ecotourism's economic contribution. This gap is interpreted as empirical evidence of structural social inequality in tourism benefit distribution: the centralized concession model administered by Perum Perhutani systematically excludes most residents from the formal economic gains of tourism, leaving them in low-return peripheral roles, while tourists observe only surface-level commercial activity and incorrectly infer broad community welfare improvement. This constitutes precisely the failure mode that Community-Based Tourism theory identifies when participation remains at the lower rungs of Arnstein's participation ladder—informing and consulting rather than partnership and delegated power. Third, these findings demonstrate that the two pillars of Sustainable Development Theory—environmental and economic—are not automatically co-advanced by tourism: environmental conservation can proceed successfully under the current management

model, whereas equitable economic development cannot, because the latter requires a redistribution of governance rights that the present concession structure does not provide. Practically, the findings call for Perum Perhutani and the Ketapanrame Village Government to establish a formal co-management agreement that transitions resident roles from peripheral labor to partners in profit-sharing, business licensing, and strategic planning. Without such structural reform, ecotourism at Dlundung will continue to conserve nature while perpetuating economic inequality—an outcome that fails the social equity criterion of sustainable development and undermines the long-term legitimacy and community support that ecotourism requires. This case also offers a contextually rich resource for Social Studies education, enabling students to critically examine the relationships between environmental governance, economic distribution, and social justice within a locally grounded setting.

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