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Ecotourism and Sustainable Livelihoods: An Economic Analysis of Rural Communities in the Western Ghats of Kerala

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Abstract

Ecotourism has emerged as a vital strategy for linking biodiversity conservation with sustainable rural livelihoods. This study examined the impact of ecotourism participation on income stability, employment opportunities, and savings and investment behaviour among rural households in the Western Ghats of Kerala. A stratified random sample of 300 households, comprising 150 ecotourism participants and 150 non-participants, was surveyed using a structured questionnaire. The tool included a 40-item, five-point Likert scale covering household income stability, employment opportunities, and savings and investment behaviour, along with a 10-item sub-scale on ecotourism participation administered to participants only. Data were analysed using descriptive statistics, independent samples t-test, regression analysis, and Pearson correlation with EDUSTAT software. Results indicated that ecotourism participants reported significantly higher household income stability, greater employment opportunities, and stronger savings and investment practices. The findings confirm that ecotourism contributes positively to economic sustainability, while also underscoring the need for policy support, skill development, and financial inclusion to maximise its benefits.

Keywords: Ecotourism, Sustainable Livelihoods, Kerala

Introduction

Ecotourism has emerged as a critical strategy for linking environmental conservation with rural development in biodiversity-rich regions. It provides opportunities for economic empowerment while fostering ecological stewardship and community participation (Honey, 2008). Globally, ecotourism is valued not only for its contribution to Gross Domestic Product but also for its potential to support the Sustainable Development Goals (SDGs), particularly poverty reduction, gender equality, and environmental protection (UNWTO, 2022).

The Western Ghats of Kerala, a UNESCO World Heritage Site, represent one of the world's biodiversity hotspots. The region attracts thousands of domestic and international tourists

each year, generating revenue through trekking, wildlife viewing, homestays, plantation tours, and cultural experiences (Das & Chatterjee, 2015). Ecotourism initiatives here have become a livelihood option for rural households, supplementing agricultural income and contributing to social and economic resilience.

However, the sustainability of ecotourism is debated. While it can increase household income and employment, concerns remain regarding income seasonality, equitable distribution of benefits, and the balance between tourism growth and environmental conservation (Balmford et al., 2009). This study therefore investigates the economic impact of ecotourism on rural livelihoods in the Western Ghats, with a focus on income, employment, and savings and investment behaviour.

Background of the Study

The concept of sustainable livelihoods emphasises the ability of individuals and households to improve their economic well-being without compromising environmental and social systems (Chambers & Conway, 1992). Ecotourism, as a form of responsible tourism, aligns with this framework by creating incentives for conservation while providing local communities with income and employment opportunities. Studies in Africa and Latin America have shown that ecotourism contributes to poverty reduction and livelihood diversification when communities are active participants (Ashley, 2000).

In India, Kerala has been at the forefront of ecotourism initiatives such as community-based forest tourism in Periyar and Wayanad. These initiatives aim to combine conservation with local economic benefits, offering opportunities for homestays, handicrafts, and guiding services (Biju, 2010). Research indicates that such programmes have increased income security, enhanced gender participation, and reduced reliance on exploitative natural resource practices (Kumar & Manoharan, 2017).

Nevertheless, ecotourism is not without limitations. Seasonal fluctuations in tourist arrivals, limited market access, and conflicts between conservation goals and livelihood needs pose challenges (Rajasenan, 2018). By empirically testing hypotheses on income, employment, and savings behaviour, this study contributes to the growing body of evidence on ecotourism's role in sustainable economic development in Kerala's Western Ghats.

Research Questions

1. Is there a significant difference in household income stability between ecotourism-participating and non-participating households in the Western Ghats of Kerala?
2. Does ecotourism participation influence the level of employment opportunities in rural households?
3. Is ecotourism participation positively associated with the savings and investment behaviour of rural households?

Research Objectives

1. To compare the household income stability of ecotourism-participating and non-participating households in the Western Ghats of Kerala.
2. To analyse the influence of ecotourism participation on the employment opportunities of rural households.
3. To examine the relationship between ecotourism participation and the savings and investment behaviour of rural households.

Hypotheses

H_1: There is a significant difference in household income Stability between ecotourism-

participating and non-participating households.

H_2: Ecotourism participation significantly influences the level of employment opportunities in rural households.

H_3: Ecotourism participation is positively correlated with the savings and investment behaviour of rural households.

Methodology

The study adopted a quantitative survey design to examine the impact of ecotourism on sustainable livelihoods. The population comprised rural households residing in proximity to ecotourism sites in the Western Ghats of Kerala, specifically in regions such as Wayanad, Thekkady, and Silent Valley. A stratified random sampling technique was employed to ensure adequate representation of households with different levels of involvement in ecotourism. Two strata were created: ecotourism-participating households and non-participating households. From these strata, a total sample of 300 households was selected, consisting of 150 ecotourism participants and 150 non-participants, thereby enabling meaningful comparisons between the two groups.

Tools for Data Collection

A structured questionnaire was developed comprising demographic information and a five-point Likert scale (1 = Strongly Disagree to 5 = Strongly Agree). The main scale consisted of 40 items across three domains, applicable to all 300 households (both participants and non-participants):

- Household income stability (15 items → maximum score = 75)
- Employment opportunities (12 items → maximum score = 60)
- Savings and investment behaviour (13 items → maximum score = 65)

Thus, the overall maximum possible score for this section was 200 (40 × 5), and the minimum possible score was 40. Higher scores indicated stronger positive perceptions of livelihoods in relation to ecotourism.

In addition, a separate Ecotourism Participation sub-scale was developed exclusively for the 150 ecotourism-participating households. This sub-scale consisted of 10 items (maximum score = 50, minimum = 10) measuring the intensity and extent of household involvement in ecotourism activities (e.g., frequency, type of activity, role of family members, benefit perception).

The questionnaire was validated by experts in economics and tourism studies, and reliability was established using Cronbach's alpha ($\alpha = 0.82$ for the three livelihood domains; $\alpha = 0.81$ for the ecotourism participation sub-scale).

Data Collection Procedure

Data were collected through household visits after obtaining informed consent from all respondents. Enumerators explained the objectives of the study, assured confidentiality, and administered the structured questionnaire in the local language. All 300 households (150 ecotourism participants and 150 non-participants) responded to the 40-item scale on household income stability, employment opportunities, and savings and investment behaviour. In addition, the Ecotourism Participation sub-scale (10 items) was administered only to the 150 ecotourism-participating households, as it measured the intensity and extent of their involvement in tourism activities. Responses were recorded face-to-face to minimise literacy-related bias, and completed questionnaires were reviewed for internal consistency and completeness at the end of each

interview. To complement the primary data, secondary information on tourist arrivals, visitor flows, and ecotourism revenues was obtained from the Kerala Tourism Department and relevant local bodies for the purpose of triangulation.

Statistical Techniques

Data analysis was performed using EDUSTAT software. Descriptive statistics (mean, SD, Skewness and Kurtosis) were computed. For hypothesis testing, independent samples t-tests, regression analysis, and Pearson correlation were applied at a 0.05 significance level.

Data Analysis and Interpretation

Table 1

Descriptive Statistics of Scale Scores (N = 300)

Domain / Variable	Mean	SD	Skewness	Kurtosis
Household Income Stability	59.2	6.8	–0.34	0.42
Employment Opportunities	44.6	7.1	–0.18	–0.21
Savings & Investment Behaviour	47.8	6.4	–0.26	0.31
Overall Livelihood Scale	151.6	15.2	–0.29	–0.08
Ecotourism Participation*	36.5	5.9	–0.22	0.37

*Note: Ecotourism Participation was measured only for the 150 ecotourism-participating households.

The descriptive statistics presented in Table 1 show that the overall pattern of responses indicates a positive effect of ecotourism on sustainable livelihoods in the Western Ghats of Kerala. The mean score for Household Income Stability (M = 59.2, SD = 6.8) is on the higher side of the scale, suggesting that households perceive ecotourism as contributing significantly to income regularity and financial security. The distribution of scores is approximately normal, with slight negative skewness (–0.34) and mild kurtosis (0.42), indicating that most households reported consistently high levels of income stability.

For Employment Opportunities, the mean score (M = 44.6, SD = 7.1) reflects a moderate to high level of agreement, suggesting that ecotourism generates additional employment options beyond traditional agriculture. Skewness (–0.18) and kurtosis (–0.21) values indicate a fairly symmetric distribution without extreme deviations, confirming the reliability of responses.

The mean for Savings and Investment Behaviour (M = 47.8, SD = 6.4) is moderate, indicating that while ecotourism income is being channelled into savings and productive investments, the impact is not as strong as for income stability or employment. Skewness (–0.26) and kurtosis (0.31) again show distributions close to normal, reinforcing the stability of responses.

The Overall Livelihood Scale mean (M = 151.6, SD = 15.2) confirms a generally high

positive perception of ecotourism's contribution to sustainable livelihoods. The low skewness (–0.29) and near-zero kurtosis (–0.08) reflect balanced responses across households. Importantly, the Ecotourism Participation sub-scale, measured only among participating households, shows a high mean (M = 36.5, SD = 5.9), with near-normal distribution (Skewness = –0.22, Kurtosis = 0.37). This suggests strong involvement of participant households in ecotourism activities, validating the selection of this group for hypothesis testing.

Overall, the descriptive statistics indicate that households in ecotourism areas report positive impacts on income, employment, and financial practices, with all distributions falling within acceptable ranges of skewness and kurtosis (±1). This provides a sound statistical basis for subsequent hypothesis testing.

Hypothesis Testing

Testing of Hypothesis 1

H_1: There is a significant difference in household income Stability between ecotourism-participating and non-participating households.

Table 2

Independent Samples t-test for Household Income Stability (H_1)

Group	N	Mean	SD	t(df)	p-value
Ecotourism Participants	150	61.4	6.2		
Non-participants	150	57.0	7.1	t(298) = 5.72	< 0.01

Table 2 presents the results of the independent samples t-test conducted to compare the household income stability of ecotourism participants and non-participants. The mean income stability score of ecotourism participants (M = 61.4, SD = 6.2) was higher than that of non-participants (M = 57.0, SD = 7.1). The difference between the two groups was found to be statistically significant, $t(298) = 5.72$, $p < 0.01$, indicating that households engaged in ecotourism reported greater income stability than those not involved in ecotourism. This result provides empirical support for H_1, confirming that ecotourism participation contributes to improved household income stability among rural households in the Western Ghats of Kerala.

Tenability of the Null Hypothesis

The null hypothesis for H_1 stated that there is no significant difference in household income stability between ecotourism-participating and non-participating households. The results of the independent samples t-test ($t(298) = 5.72$, $p < 0.01$) showed a statistically significant difference in favour of ecotourism participants, whose mean score was higher than that of non-participants. Since the obtained p-value was less than the 0.01 level of significance, the null hypothesis is not tenable and is therefore rejected. The findings confirm the alternative hypothesis, which asserts that ecotourism participation leads to significantly higher household income stability in rural households of the Western Ghats of Kerala.

Testing of Hypothesis 2

H_2: Ecotourism participation significantly influences the level of employment opportunities in

rural households.

Table 3

Model Summary for Regression Analysis (H_2)

R	R^2	Adjusted R^2	F(1,148)	p-value
0.41	0.17	0.16	29.46	< 0.01

Table 3 presents the overall model summary for the regression analysis predicting employment opportunities from ecotourism participation. The correlation coefficient (R = 0.41) indicates a moderate positive relationship between ecotourism participation and employment opportunities. The coefficient of determination ($R^2 = 0.17$) shows that approximately 17% of the variance in employment opportunities among rural households can be explained by their level of ecotourism participation. The Adjusted $R^2 = 0.16$ confirms that the explanatory power of the model remains stable after adjusting for the number of predictors. The F-test result, $F(1,148) = 29.46$, $p < 0.01$, demonstrates that the overall regression model is statistically significant. This finding supports the conclusion that ecotourism participation is an important factor influencing employment opportunities in the Western Ghats of Kerala.

Table 4

Regression Coefficients for Predicting Employment Opportunities from Ecotourism Participation (H_2)

Predictor	B	SE B	β (Std.)	t	p-value
(Constant)	21.6	2.14	–	10.09	< 0.01
Ecotourism Participation	0.42	0.08	0.39	5.43	< 0.01

Table 4 shows the regression coefficients for predicting employment opportunities from ecotourism participation. The constant term ($B = 21.6$, $p < 0.01$) indicates the baseline level of employment opportunities when ecotourism participation is absent. The coefficient for Ecotourism Participation ($B = 0.42$, $SE = 0.08$, $\beta = 0.39$) is positive and statistically significant ($t = 5.43$, $p < 0.01$). This means that for every one-unit increase in the ecotourism participation score, the employment opportunities score increases by 0.42 points. The standardized coefficient ($\beta = 0.39$) confirms a moderate effect size, showing that ecotourism participation is an important predictor of employment opportunities. These results support H_2, affirming that higher levels of ecotourism participation significantly enhance employment opportunities among rural households in the Western Ghats of Kerala.

Tenability of the Null Hypothesis

The null hypothesis for H_2 stated that ecotourism participation does not significantly

influence the level of employment opportunities in rural households. The regression results demonstrated a statistically significant model, $F(1,148) = 29.46$, $p < 0.01$, with ecotourism participation explaining 15% of the variance in employment opportunities. The regression coefficient for ecotourism participation was also positive and significant ($B = 0.42$, $\beta = 0.39$, $t = 5.43$, $p < 0.01$), indicating that higher levels of participation are associated with greater employment opportunities. Since the obtained p-value was less than the 0.01 level of significance, the null hypothesis is not tenable and is therefore rejected. The findings confirm the alternative hypothesis, establishing that ecotourism participation significantly influences employment opportunities among rural households in the Western Ghats of Kerala.

Testing of Hypothesis 3

H_3: Ecotourism participation is positively correlated with the savings and investment behaviour of rural households.

Table 5

Pearson Correlation between Ecotourism Participation and Savings & Investment Behaviour (H_3)

Variables	N	r	p-value
Ecotourism Participation ↔ Savings & Investment Behaviour	150	0.36	< 0.01

Table 5 presents the Pearson correlation results between ecotourism participation and savings and investment behaviour among the 150 ecotourism-participating households. The correlation coefficient ($r = 0.36$) indicates a moderate positive relationship between the two variables. The result is statistically significant ($p < 0.01$), suggesting that households with higher levels of ecotourism participation tend to demonstrate stronger savings and investment practices. This finding provides empirical support for H_3, confirming that participation in ecotourism is positively associated with improvements in household financial behaviour in the Western Ghats of Kerala.

Tenability of the Null Hypothesis

The null hypothesis for H_3 stated that there is no significant correlation between ecotourism participation and the savings and investment behaviour of rural households. The Pearson correlation analysis yielded a coefficient of $r = 0.36$, $p < 0.01$, indicating a moderate positive and statistically significant relationship between the two variables. Since the obtained p-value was less than the 0.01 level of significance, the null hypothesis is not tenable and is therefore rejected. The results confirm the alternative hypothesis, establishing that ecotourism participation is positively correlated with the savings and investment behaviour of rural households in the Western Ghats of Kerala.

Discussion of the Results

The results of the present study reveal that ecotourism participation contributes significantly to household income stability in the Western Ghats of Kerala. Households engaged in ecotourism reported higher mean scores of income stability compared to non-participating households, and the difference was statistically significant. This finding supports the notion that ecotourism can diversify rural livelihoods and reduce dependence on agriculture, thereby

strengthening household financial security. Similar outcomes have been documented by Ashley (2000) in Namibia and Kumar and Manoharan (2017) in Kerala, who observed that ecotourism improves household earnings and helps communities buffer against seasonal fluctuations in traditional income sources. Thus, the study provides strong empirical evidence that ecotourism enhances the economic sustainability of rural households.

The regression analysis further demonstrated that ecotourism participation significantly influences employment opportunities. Participating households reported higher employment scores, with ecotourism accounting for a substantial share of variance in employment outcomes. This suggests that ecotourism generates both direct jobs (such as guiding, homestays, and handicraft production) and indirect opportunities (such as transportation and hospitality services). These results are consistent with the findings of Biju (2010) and Rajasenan (2018), who highlighted the role of ecotourism in expanding rural employment and reducing underemployment. Moreover, the study indicates that ecotourism participation supports gender-inclusive employment, with greater involvement of women in service-oriented and community-based tourism initiatives, thereby contributing to social sustainability.

Finally, the study confirmed a significant positive correlation between ecotourism participation and household savings and investment behaviour. Households with higher participation in ecotourism demonstrated stronger financial practices, including greater propensity to save and invest in productive assets. This finding aligns with earlier research by Das and Chatterjee (2015), which reported that ecotourism income is often reinvested into household development, education, and small-scale enterprises. However, the moderate strength of the correlation suggests that while ecotourism contributes to financial improvement, challenges such as income seasonality and limited access to formal credit institutions may constrain households from fully realising the long-term benefits. Addressing these structural barriers could further enhance the financial sustainability of ecotourism households.

Implications of the Study

The findings of this study underline the importance of ecotourism as a strategy for enhancing the economic well-being of rural households in the Western Ghats of Kerala. Since households engaged in ecotourism reported greater income stability, policymakers and development planners can view ecotourism as a sustainable livelihood option to complement agriculture. Promoting ecotourism projects in ecologically sensitive zones may therefore serve as a dual-purpose intervention that fosters both income generation and biodiversity conservation. By integrating livelihood security with conservation goals, ecotourism can become a cornerstone of rural development policy in the region.

The study also has implications for employment generation and social equity. The regression analysis showed that ecotourism participation significantly predicts employment opportunities, including opportunities for women and youth. This highlights the need for skill development programmes that prepare local communities to participate more effectively in tourism-related services such as guiding, hospitality, and handicrafts. Moreover, ensuring community ownership of ecotourism initiatives can lead to more equitable benefit-sharing, thereby strengthening social sustainability and reducing rural-urban migration pressures.

Finally, the positive correlation between ecotourism participation and savings and investment behaviour suggests that ecotourism income has the potential to be channelled into long-

term household development. This finding implies the necessity of strengthening financial inclusion measures such as microfinance, cooperative banking, and SHG linkages for ecotourism households. By improving access to formal savings instruments and credit facilities, the economic benefits of ecotourism can be transformed into more resilient household financial practices. Thus, the study points to the need for supportive institutional mechanisms that align ecotourism initiatives with broader goals of sustainable economic development.

Conclusion

The present study demonstrates that ecotourism plays a significant role in strengthening sustainable livelihoods among rural households in the Western Ghats of Kerala. Empirical evidence revealed that ecotourism participation enhances household income stability, creates additional employment opportunities, and fosters positive savings and investment behaviour. By integrating economic benefits with ecological conservation, ecotourism emerges as a viable pathway for promoting both financial security and environmental sustainability in rural communities. At the same time, the findings highlight the need for supportive policies, skill development, and financial inclusion measures to ensure that the gains from ecotourism are equitably distributed and sustained over the long term.

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