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Enhancing Lives of Tribal Communities through Forest Ecotourism

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Abstract

Forest Ecotourism is considered as sustainable strategy that balances environment conservation and socioeconomic benefits to the local community. Kerala is well known for its rich biodiversity and extensive forest area, the ecotourism initiatives of Kerala Forest Department play a crucial role in improving the livelihoods of local communities, especially the tribal people residing in the fringes of forest. The study examines the impact of Ecotourism facilitation (ETF) on income generation (IG)and livelihood enhancement (LHE)among tribal people, who actively engaged in ecotourism activities. This research is based on the conceptual framework that studies and validates both direct and indirect relationships between these constructs using Structural Equation Modelling (SEM) with the Partial Least Squares approach. The results confirm that the Government or Forest Department's support in providing infrastructure, ensuring local community participation and managing human-wildlife conflicts significantly influences the income generation of tribal communities engaged in ecotourism. The SEM analysis reveals that the income generation partially mediates the relationship between ecotourism facilitation and livelihood enhancement, showing the importance of the economic benefits of ecotourism. This study also finds that younger tribal members of VSS and EDC experience greater livelihood improvements than older age groups, suggesting the need for more skill development programs. From a policy perspective, the study highlights the need for investment in eco-friendly infrastructure, skill training programs and other inclusive management strategies and there by maximizing socio-economic benefits while ensuring sustainability.

Keywords: *Forest Ecotourism, Income Generation, Livelihood Enhancement, Sustainable Tourism, Tribal Community Development.*

1. Introduction

Forest-based ecotourism involves responsible travel to forest destinations that helps to conserve forest ecosystems while enhancing the livelihoods of local communities living in the forest fringes (Gezahegn et al., 2024). In Kerala, ecotourism plays a crucial role in fostering economic growth and livelihood enhancement for tribal communities residing in forest regions, the state is known for its rich biodiversity and forest cover (Ranjith, 2020). Government of Kerala and the State Forest Department initiatives were critical in promoting sustainable eco-tourism through the Eco Development and Tribal Welfare Wing(*Welcome to Kerala Eco Tourism- Official Ecommerce Website of Department of Forest, Government of Kerala*, n.d.). Projects under

Participatory Forest Management (PFM), including Ecotourism, have empowered the tribal communities by providing experiences, and involvement in forest conservation activities. Collaboration with the Kerala Forest Department has enhanced human-wildlife interaction management and increased tribal participation in eco-tourism, while membership in Vana Samrakshana Samities (VSS) and Eco-Development Committees (EDC) has improved access to valuable resources and support systems (Forest et al., 2016).

The facilitation of ecotourism in Kerala by government agencies has generated much employment opportunities, helped in improving infrastructure, and enhanced income generation for local communities(Thampi, 2005). By promoting local tribal populations in participation in tourism activities, exploring the local ecotourism possibilities provide financial stability as well as contribute to the preservation of indigenous knowledge and culture (Phoek et al., 2021).

This study aims to examine the impact of government-facilitated ecotourism on the livelihood enhancement and income generation of tribal communities in Kerala. The research is based on a conceptual framework that explores the direct and indirect relationships between ecotourism facilitation (ETF), income generation (IG), and livelihood enhancement (LHE). The hypotheses tested in this study analyse how government interventions in ecotourism influence the economic well-being of tribal communities and whether income generation acts as a mediating factor in enhancing their overall standard of living.

Using a structured survey conducted across multiple ecotourism destinations in Kerala, this study seeks to provide empirical insights into the effectiveness of ecotourism as a tool for sustainable development. The findings will contribute to policymaking and offer recommendations for improving ecotourism models to maximize benefits for tribal communities while ensuring ecological conservation.

2. Literature Review and Hypothesis development

Ecotourism is recognized as a sustainable tourism model that balances environmental conservation with socio-economic benefits for local communities (TIES, 2011). It involves responsible travel to natural areas that conserves the environment and improves the well-being of local people (Bricker, 2017). The role of ecotourism in promoting economic and social development has been widely documented, particularly in regions with significant biodiversity and indigenous populations (Septiawan et al., 2023). In Kerala, ecotourism has attained momentum with government-led initiatives aimed at integrating tribal communities into tourism activities, thus providing them with income opportunities and livelihood enhancement (Alexander et al., 2024).

Government agencies play a vital role in promoting ecotourism by providing infrastructure, policy support, and capacity-building programs (Kedir et al., 2018). Studies have shown that government-supported ecotourism ensures sustainable tourism management, enhances local participation, and improves revenue generation for indigenous communities (Robinson et al., 2013). In Kerala, the Kerala Forest Department and various government agencies have implemented ecotourism projects that focus on community participation, biodiversity conservation, and economic upliftment (Soman & Anitha, 2020). These efforts indicate that effective government support positively impacts livelihood development (Holland et al., 2022). Based on these literatures, the following hypothesis is proposed.

H1: Eco-Tourism facilitation (ETF) by the government has positive direct effect on Livelihood enhancement

(LHE) of local tribal communities involved in Eco-Tourism activities

Ecotourism serves as a major source of income for indigenous and local communities by creating employment and entrepreneurial opportunities (Septiawan et al., 2023) as it places emphasis on both natural and cultural sustainability. The study aims to identity the development of ecotourism and their effects on the socio-economic of local communities by using Systematic Literature Review (SLR. The involvement of local communities in ecotourism, such as tour guiding, handicrafts, eco-lodging, and the sale of forest produce, has been found to increase household income levels (Deng et al., 2011) an evaluation system by which ecotourism destinations can be evaluated and rated needs to be developed to reflect the relative importance of destination criteria/ indicators. This case study evaluates a point evaluation system based on ecotourism destination criteria and indicators identified by ecotourism academics and ecotourism operators using a two-round Delphi survey for forest ecotourism in West Virginia. Results indicate that operators are less likely than academics to value local participation and involvement (43 points for operators vs. 84 points for academics. In Kerala, studies have shown that ecotourism contributes significantly to the income of tribal communities by providing alternative income sources beyond traditional forest-based occupations (Abraham, 2015).Based on these literatures, the following hypothesis is proposed.

H2: Eco-Tourism facilitation (ETF) by the government has positive direct effect on the income generation (IG) of local tribal communities involved in Eco-Tourism activities.

Economic benefits derived from ecotourism have a direct impact on the overall well-being of local communities (Bu et al., 2021). Higher income levels contribute to improved standards of living, better education, and access to healthcare services (Ma et al., 2019). Studies on ecotourism in developing regions suggest that income generation from tourism activities leads to long-term socio-economic benefits for tribal communities (Saha et al., 2015). In the context of Kerala, previous research highlights that tribal communities engaged in ecotourism experience progress in their quality of life and economic security(Soman & Anitha, 2020).

Based on these literatures, the following hypothesis is proposed.

H3: Income generation (IG) by the local tribal communities involved in Eco-Tourism activities has positive direct effect on their Livelihood enhancement (LHE).

The indirect relationship between ecotourism facilitation and livelihood enhancement through income generation has been emphasized in several studies. Government-led ecotourism initiatives create an enabling environment that fosters economic opportunities, which in turn leads to an improved standard of living for local communities (Strydom et al., 2018). In Kerala, ecotourism has been found to serve as a key mechanism for sustainable rural development by enhancing employment and income generation, which consequently improves living conditions (Kumavat, 2021). Based on these literature premises following hypothesis is proposed.

H4: Eco-Tourism facilitation (ETF) by the government agencies has positive indirect effect on Livelihood enhancement (LHE) of local tribal communities through the income generated (IG) by their involvement in Eco-Tourism activities.

2.1 Conceptual framework

The conceptual framework for this study is based on the linkage between **Eco-Tourism Facilitation (ETF)** by government agencies, **Income Generation (IG)**, and **Livelihood Enhancement (LHE)** of local communities, especially tribal people involved in ecotourism activities. The framework illustrates how ecotourism initiatives facilitated by government agencies directly and indirectly impact the economic well-being and overall quality of life of tribal communities.

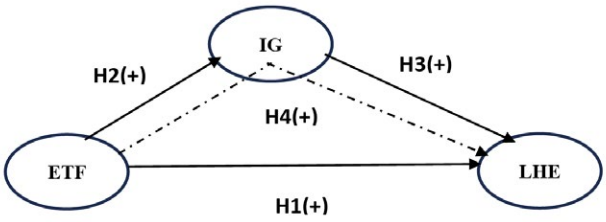

Figure 1. Hypothesized relationship between the constructs ETF, IG, and LHE

3. Research methodology

3.1 Population and Sample

The population of the study is ecotourists from 110 ecotourism destinations in Kerala. Multistage random sampling procedure was adopted for data collection. Samples were collected from 12 randomly selected ecotourism destinations in Kerala (4 each from South, Central, and North Regions of Kerala). A total number of 440 numbers of structured questionnaires were utilised for data collection from the respondents. In return, we received 386 questionnaires as the effective responses (effective return rate is 87.7 percent). This sample size is appropriate for data analysis in management research (Andy Field, 2009; Rick and Paul, 2004) including Structural Equation Modelling (Hair, Black, Babin and Anderson, 2017; Kline, 2011). The sample characteristics such as age group, gender, category of tourist, and region of the respondents are presented in Table 1.

Table 1. Sample characteristics

Demographic Profile of Respondents		Frequency	Percentage
Age Group	<30 years	116	30.1
	30 years and more	270	69.9
	Total	386	100
Gender	Male	272	70.4
	Female	114	29.6
	Total	386	100
Region	North	113	29.3
	Central	130	33.7
	South	143	37
	Total	386	100

Source: Primary Survey.

3.2 Questionnaire design and measurement of constructs

A structured questionnaire was used to collect the data. It contains two sections. The first section comprises demographic profile of respondents viz. as age group, gender, and region of the respondents. The second section contains the items to measure the constructs, Eco-Tourism facilitation (ETF) by the government agencies, Livelihood enhancement (LHE) of local tribal communities, and the income generated (IG) by their involvement in Eco-Tourism activities. The construct Eco-Tourism facilitation (E0.125TF) was measured by using four items: (i) The government agencies are supportive to provide adequate infrastructure to facilitate eco-tourism, (ii) Involvement of local tribal community is ensured in Eco-tourism activities, (iii) Smooth information flow is ensured among forest officials, tribal communities, and tourists, and (iv) Scientific management of human wildlife issues with the support of Kerala Forest department officials (Salam, 2024)

The construct Livelihood enhancement (LHE) of local tribal communities is measured by using three items: (i) Standard of living of the local communities have improved due to Tourism, (ii) Tourism helped the society to access better education to their children, and (iii) Tourism helped the local people to access quality health care facilities (Nepal et al., 2022)

The construct Income Generation (IG) of local tribal communities is measured by using three items: (i) Tourism is the main source of income generation for the tribal community, (ii) A major portion of your total income is earned from Tourism activities, and (iii) The minor forest produce collected by local community generates additional income through eco-tourism(Forest et al., 2016).

Identical weightage was assigned to all the items of respective factors for computing the value of the same. All the items of the constructs ETF, LHE, and IG are measured by using five-point Likert scale with five

anchor points. The anchor descriptors are: Strongly agree (scale weightage value =5), Agree (scale weightage value =4), Neutral (scale weightage value =3), Disagree (scale weightage value =2), Strongly disagree (scale weightage value =1).

3.3 Data Analysis

The conceptual model proposed in this study was validated and tested using Structural equation modelling (SEM) through partial least squares path modelling approach (PLS -PM). The path model is proposed to predict the Livelihood enhancement of local tribal communities in eco-tourism destinations in Kerala. In the prediction oriented multivariate modelling PLS -PM is a recommended approach (Calvo-Mora et al., 2020; Cepeda-Carri´on et al., 2016). The non- normal data distributions can also be handled by PLS path modelling (Hair et al., 2022). As the study is focussed with preference for prediction, the researcher proceeded the analysis using PLS PM approach (Hair et al., 2022; Hair et al., 2019). The PLS PM based SEM software "SmartPLS 4" (Ringle et al., 2024) has been used for testing and validation of the proposed model.

3.4 Assessment of Common method bias and multi-collinearity

As the study utilises cross sectional data, the possibilities of common method bias (CMB) have been examined as suggested by Podsakoff et al., (2003). The Harman's Single-Factor test was used to evaluate the CMB and found that the total variance explained by a single factor is 43.17%, which is fairly below the critical threshold value of 50% (Podsakoff et al., 2003). This indicates that the CMB is not a matter of concern in the study.

The multi-collinearity of independent constructs in the path model is assessed using variance inflation factor (VIF) (Hair et al., 2020). The VIF value is 1.362 (Table 4) for the constructs ETF and IG, and is well below the threshold value of 3.3 (Kock, 2015). Therefore, the multicollinearity issues are ruled out in the model.

3.5 Measurement model assessment

The reliability of the measures Eco-Tourism facilitation (ETF) by the government agencies, Income Generated (IG) by tribal communities through their involvement in Eco-Tourism activities, and the Livelihood enhancement (LHE) proposed in the structural path model is assessed by computing Cronbach's Alpha Coefficient, Henseler's Rho (ρA), and Composite reliability (ρC). The convergent validity of constructs was assessed using factor loadings and AVE (average variance extracted). The results of confirmatory factor analysis are shown in Table 2.

Table 2. Measurement model assessment results

Construct	Items	Factors Loadings	Cronbach's alpha	Henseler's Rho (ρA)	Composite reliability (ρC)	Average variance extracted (AVE)
Eco-Tourism facilitation (ETF)	ETF1	0.863	0.873	0.874	0.913	0.724
	ETF2	0.830				
	ETF3	0.858				
	ETF4	0.852				
Income Generation (IG)	IG1	0.888	0.853	0.854	0.911	0.773
	IG2	0.880				
	IG3	0.871				
Livelihood enhancement (LHE)	LHE1	0.877	0.857	0.857	0.913	0.777
	LHE2	0.880				
	LHE3	0.887				

The factor loadings for all the indicators are more than 0.7, represent adequate level of indicator reliability (Sarstedt, et al., 2017). The AVE values of all the latent constructs in the model are above 0.5, satisfies the criteria of convergent validity (Hair et al. 2017; Liu and Li, 2010; Campbell and Fiske, 1959). Therefore, all the constructs in the model are adequately explained by their respective measured variables. The Henseler's Rho (ρA) and Composite reliability (ρC) (ranging between of 0.70 and 0.95), and Cronbach's Alpha (> 0.7) represent adequate level of reliability of all the constructs (Hair et al., 2019). The discriminant validity of the constructs Eco-Tourism facilitation (ETF), Income Generation (IG), and Livelihood enhancement (LHE)was evaluated using HTMT (Hetero Trait – Mono Trait) ratio of correlations as suggested by Henseler et al. (2015). The HTMT correlations between the constructs are shown in Table 3.

Table 3. Discriminant validity

Hetero Trait – Mono Trait (HTMT) correlations between constructs			
Constructs	HTMT correlations	Confidence Interval	
		2.50%	97.50%
IG <-> ETF	0.595	0.559	0.759
LHE <-> ETF	0.729	0.635	0.815
LHE <-> IG	0.791	0.181	0.424

The HTMT ratios between all the three constructs are quite below the cut-off value of 0.85, hence meets the standards of discriminant validity as posited by Henseler et al. (2015). The confidence interval approach using bootstrapping technique with 10000 bootstrap samples was used to determine the significance of the HTMT ratios.

3.6 Structural model assessment and hypotheses testing

The structural model assessment and hypotheses testing were done in accordance with the suggestions of Hair et al. (2019, 2022). The maximum value of VIF inner, 1.378 (<3.33), in the model indicates the non-critical level of multi-collinearity among the exogenous constructs (Hair et al., 2020). The method of bootstrapping (Henseler et al., 2015) with 10000 bootstrap samples was applied to determine the significance of the path coefficients. The results of the partial least squares structural path model analysis (standardised path coefficients (β), significance, variance inflation factor (VIF) inner, and f-square values) are presented in Table 4.

Table 4. Results of Hypothesis Testing

Hypotheses		β coefficient	T statistics	P values	Confidence Interval		Significance?	VIF	f square
				2.5%	97.5%			Inner	
H1	ETF -> LHE	0.382	6.841	0.000	0.272	0.488	Yes	1.362	0.249
H2	ETF -> IG	0.516	10.119	0.000	0.410	0.609	Yes		0.362
H3	IG -> LHE	0.469	8.574	0.000	0.361	0.575	Yes	1.362	0.372
H4	ETF -> IG -> LHE	0.242	6.371	0.000	0.173	0.321	Yes		
CV	Age Group -> LHE	-0.152	2.351	0.019	-0.279	-0.028	Yes		

The significant predictors of Livelihood enhancement of tribal communities involved in eco-tourism activities are Eco-Tourism facilitation (β coefficient = 0.382, p<0.000, supports the hypothesis H1) and Income Generation (β coefficient = 0.469, p<0.000, supports the hypothesis H3). The Income Generation is influenced by Eco-Tourism facilitation (β coefficient = 0.516, p<0.000, supports the hypothesis H2). The Eco-Tourism facilitation indirectly influences Livelihood enhancement of tribal communities through their income generation (β coefficient = 0.242, p<0.000, supports the hypothesis H4). The Eco-Tourism facilitation has a significant total effect (direct and indirect) on Livelihood enhancement of tribal communities (β coefficient = 0.624, p<0.000).

The age group of tribal communities involved in eco-tourism might influence the Livelihood enhancement. Therefore, we include this categorical variable as a dummy-coded control variable; age group (<30 years = 0 / 30 years and more = 1), in the structural model. The younger age group attains significantly more Livelihood enhancement than elder age groups. The coefficient of determination (R^2 value) of endogenous construct LHE in the model is 56.8%. This shows the comparatively high level of explanatory power of the income generation and eco-tourism facilitation in determining the variance of Livelihood enhancement of tribal communities involved in eco-tourism activities. The adequacy of model-fit is evaluated using Standardized Root Mean Square Residuals (SRMR). The SRMR value obtained from the estimated model is 0.056. This value is quite below the recommended cut off of 0.08, as suggested by Hair et al. (2022). The structural path model is shown in figure 2.

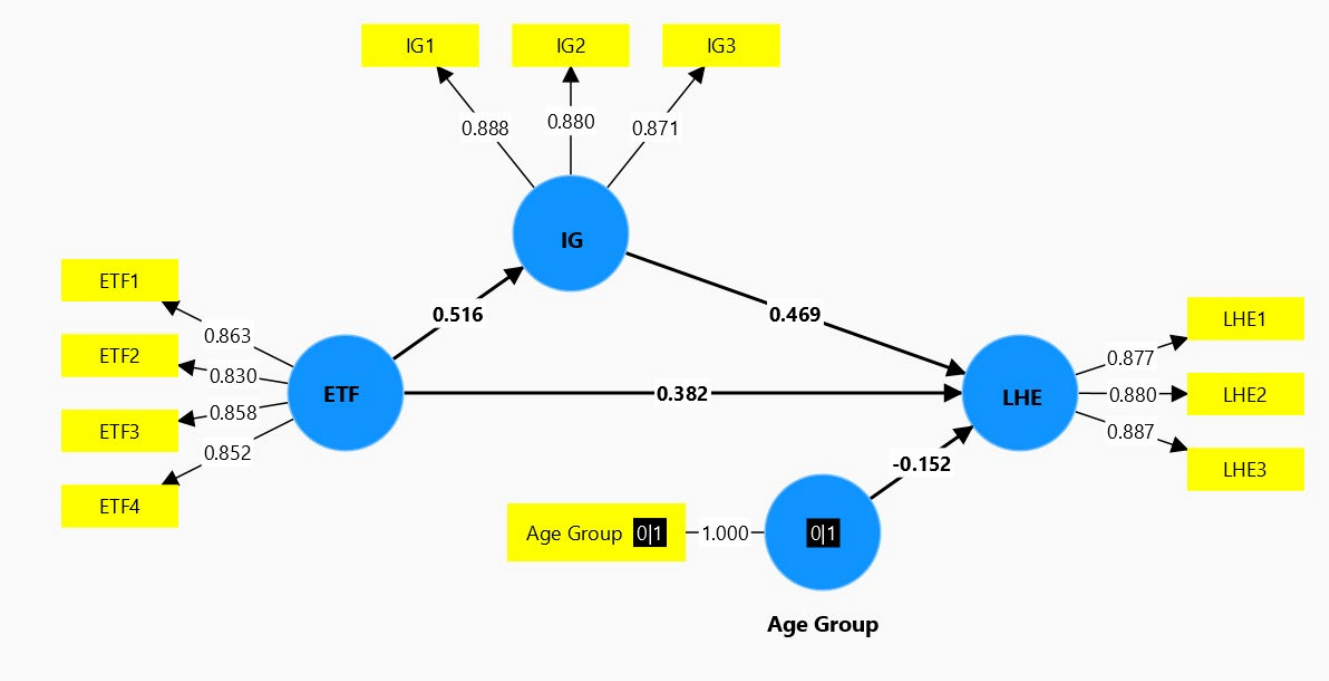

Figure 2. Structural Path Model

The detailed description of constructs, items and related abbreviations utilized for the SEM analysis are specified in Appendix 1.

The importance of an exogenous construct in explaining the variance in the endogenous construct can be estimated using the effect size (f^2) values (Hair et al., 2014). The f-square values less than or equal to 0.15 show weak effect, the values ranging from 0.15 to less than 0.35 show moderate effect, and the values more than 0.35 indicate strong effect (Cohen,1988). The f-square values of ETF in determining the variables IG (0.362) and LHE (0.249) show the its strong effect on IG and moderate effect on LHE. The Income Generation has a strong effect on livelihood enhancement (f-square value = 0.372).

4. Discussion and implications

The results established that the Eco-Tourism facilitation by the government agencies, and income generated by the involvement in Eco-Tourism activities have significant effect on livelihood enhancement of local tribal communities. The Eco-Tourism facilitation positively influences the Income Generation of tribal communities (Islam et al., 2014).The income generation through the eco-tourism has a partial mediation effect in the relationship between Eco-Tourism facilitation and Livelihood enhancement. The younger age group attains significantly more Livelihood enhancement than elder age groups (Gidebo, 2023).

5. Conclusion

This study highlights the significant role of government-facilitated ecotourism in enhancing the livelihoods of tribal communities in Kerala. The findings confirm that ecotourism initiatives not only provide direct income generation opportunities but also contribute to long-term socio-economic benefits for local communities. The positive relationship between ecotourism facilitation, income generation, and livelihood enhancement underscores the importance of policy-driven interventions in sustainable tourism. By integrating tribal communities into ecotourism activities, the government fosters economic stability while promoting ecological conservation. These insights offer valuable recommendations for strengthening ecotourism policies to maximize benefits for indigenous populations while ensuring environmental sustainability.

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Appendix 1.

Constructs, items, and corresponding abbreviations used for the analysis of structural equation modelling.

Construct	Items	Abbreviations
Eco-Tourism facilitation (ETF)	The government agencies are supportive to provide adequate infrastructure to facilitate eco-tourism	ETF1
	Involvement of local tribal community is ensured in Eco-tourism activities	ETF2
	Smooth information flow is ensured among forest officials, tribal communities, and tourists	ETF3
	Scientific management of human wildlife issues with the support of Kerala Forest department officials	ETF4
Income Generation (IG)	Tourism is the main source of income generation for the tribal community	IG1
	A major portion of your total income is earned from Tourism activities	IG2
	The minor forest produce collected by local community generates additional income through eco-tourism	IG3
Livelihood enhancement (LHE)	Standard of living of the local communities have improved due to Tourism	LHE1
	Tourism helped the society to access better education to their children	LHE2
	Tourism helped the local people to access quality health care facilities	LHE3