

Community Participation and Ecotourism: Economic Impacts in Similipal Biosphere Reserve

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ABSTRACT

The Similipal biosphere reserve in Odisha's Mayurbhanj district is rich in biodiversity and cultural diversity; it is a prime example of community-based tourism (CBT). This is a participatory model that involves local communities in the planning, management and sharing of the benefits of tourism. The present study is designed to investigate the potential of using CBT to stimulate economic growth in the Similipal region. The research uses both primary data and secondary data, means of both quantitative and qualitative approaches to look into tourist activities, to explore the economic and social conditions, to emphasise the importance of community participation in tourism and to present the challenges and future perspectives of CBT. The study revealed that tourism in Similipal is growing, but the involvement of the local communities is limited because of a lack of awareness, skills, infrastructure, and effective planning. It, however, suggests that there is a high potential for CBT in the region when adequate training, financial support and policy arrangements are in place. The study specifically emphasises the key role of community participation in ecotourism development for tribal communities' economic empowerment, cultural maintenance, and sustainable resource utilisation. Improved CBT in Similipal will be able to increase livelihoods in the area, which will also support the responsible and inclusive conservation of the rich biodiversity of Similipal.

Keywords: Similipal Biosphere Reserve, Community-Based Tourism (CBT), Economic Growth, Community Participation, Challenges and Opportunities, Cultural Preservation

INTRODUCTION

Tourism is one of the most significant industries in the world. It helps the economy, generates jobs and is a key driver of many regions. Tourism also facilitates cultural exchange by allowing people from different backgrounds to come together. Tourism has been an effective mechanism for rural development in recent years due to its ability to generate income for local people and stimulate investments in infrastructure and public services. In many countries, tourism is acknowledged as a tool for poverty alleviation and natural and cultural heritage conservation.

Ecotourism is one of the most significant advances in the tourism industry. Ecotourism, a part of responsible tourism, is the responsible and pleasing practice of travel to natural areas to appreciate and safeguard them and their natural and human-made resources. Ecotourism does not promote mass tourism, but sustainable use of natural resources. It also facilitates conservation, education about the environment and the involvement of the community. Due to such positive effects, some governments and conservation groups have turned to ecotourism as a means for sustainable development.

Effective involvement of the community is an important part of a successful ecotourism program. The people who live in the area are the true owners and guardians of natural resources. Their knowledge, culture and traditions add meaning to tourists' visits. Economic benefits are achieved directly for communities when they engage in tourism planning and management, which increases their interest in conservation of forests, wildlife and biodiversity. It also helps minimise conflicts between conservation and livelihoods in the community.

Tourism has become one of the fastest-growing sectors in the world. It has a significant economic impact, contributes to job creation and cultural exchange. Tourism is a source of foreign exchange for countries, the development of infrastructure and employment for local communities. Ecotourism has emerged as one of the various types of tourism in recent years. Eco-tourism is a sustainable tourism that is centred on nature, conservation and community involvement. It isn't just about going to a forest or a wildlife area; it's also about engaging local people in tourism and for them to benefit from it economically and socially.

Ecotourism is now an important strategy for tourism that will balance the protection of the environment with economic development. It provides jobs to local populations without harm to forests and wildlife. Communities can make a living from tourism activities, rather than relying just on forest resources. This helps to improve the balance between conservation and development. It also raises visitors' awareness of the importance of conserving biodiversity and respecting local culture.

The value of ecotourism in India has increased due to its biodiversity and cultural richness. India boasts numerous national parks, wildlife sanctuaries and biosphere reserves, which serve as popular tourist destinations. Eastern India's Odisha state is one of the areas with high ecotourism potential. It is home to some tribal communities and a natural reserve. Of these, the Similipal Biosphere Reserve is one of the more valuable protected areas. Similipal is well-known for its dense forests, waterfalls, wild animals and tribal life. It is also recognised as a UNESCO Biosphere Reserve, and so has national and international significance.

The Similipal Biosphere Reserve is very rich in biological diversity and is home to numerous rare and endangered flora and fauna. Forest, elephants, tigers, deer, birds, reptiles and medicinal plants are all common in the region. Similipal's cultural heritage is also reflected in its natural beauty, as many of the area's tribal communities have inhabited it for generations. The knowledge of the forest, medicinal plants, farming and natural resources management that they have is useful for conservation and tourism. Such a mix of nature and culture renders Similipal an appropriate region for community-based ecotourism.

Forests are a fundamental part of the livelihood of the tribal communities around Similipal. Their traditional livelihoods are farming, hunting, and gathering forest produce like fruits, honey, and medicines. These activities were sources of food and income, but in some cases they were restricted in their range. However, in the era of the 'nature tourist', new opportunities have arisen for these communities. The local people are now able to engage in tourism-related activities, like running homestays, guiding tourists, selling handicrafts, and performing cultural shows. They generate extra income, jobs and help to maintain the traditions of the tribes.

Community-based tourism is a chance for local people to be active partners rather than merely the beneficiaries. Tourism fosters families to utilise their expertise and resources to work productively. There are many women tribal members who prepare traditional food, make handicrafts, weave baskets and produce handicraft products for tourists. Eco-guides, drivers, photographers, and tourism assistants are some of the positions young people can take on. These activities enhance income generation of the households and lessen their reliance on seasonal farming. Other indirect jobs are also generated in the tourism sector, such as in transport, local markets, food supply, and other services.

Ecotourism is a community-driven initiative. If local people are engaged, they become stakeholders in tourism projects. They safeguard natural resources, preserve cultural practices and promote a fair and equitable distribution of benefits from tourism. Self-Help Groups (SHGs) and cooperatives are significant in organising participation in Similipal. SHGs assist tribal households to save money, to avail credit facilities and to initiate small business activities. They also help support tourism-related activities, trade in handicrafts and eco-guiding, to boost household income and confidence.

Cooperation among the villagers is also enhanced by community organisations. They enable group decisions and facilitate the resolution of shared issues. Communities are made aware through regular meetings and group activities of tourism opportunities and environmental conservation. They also acquire financial management and business skills. These are organisations that boost confidence and promote participation in development activities, particularly among women.

Digital banking and education further enhance community engagement via modern tools. Digital banking enables tribal households to get payments directly, avail loans and sell products online. It cuts down on reliance on middlemen and improves transparency. Education will enhance communication and financial skills, and awareness of conservation. Trained young people can be eco-guides, homestay farmers, and better communicate with tourists. These, in turn, contribute to the sustainability of ecotourism and to the linkages to the broader markets.

However, the tourism industry has also undergone some positive transformation through the use of technology. Visitors search online for tourist destinations and book online. Local entrepreneurs can market their Homestays, handicrafts, and other cultural activities using social media. Electronic payment systems make transactions simpler and safer. Internet information enables communities to know how to better serve tourists and their preferences. For this reason, digital technology is now playing an important role in the development of modern ecotourism.

Ecotourism has great promise for Similipal, but is hampered by low literacy, ill-equipped infrastructure, and lack of policy. Poor roads, electric and communication facilities are common. A lot of homes do not have knowledge and skills in tourism management. Government policies can sometimes not be implemented at the grassroots level. These barriers need to be overcome to achieve long-term success. The importance of studying community participation in the development of ecotourism in Similipal is therefore crucial, as it demonstrates possible ways of achieving both economic empowerment and social transformation, while also conserving natural and cultural resources, through involvement by local communities.

There is also a challenge of inequitable distribution of tourism benefits. Some villages are more popular than others, and some families just do not have the means to engage in tourism activities. Income opportunities are also limited by low availability of financial resources, weak marketing capabilities and poor transport links. Tourism, if not managed, can also create environmental issues like waste disposal problems and shortage of natural resources. Thus, there is a need for these local communities to participate actively in the sustainable tourism development process along with careful planning.

The present study deals with the linkage between the participation of the community and the economic effects of ecotourism in the Similipal Biosphere Reserve. Its objective is to "learn" about the roles local participation plays in employment creation, income enhancement, entrepreneurship and rural development generally. The study also investigates the contribution of government assistance, Self-Help Groups, education, digital technology and conservation towards sustainable tourism. The results will benefit policy makers, researchers, tourism planners and the local communities. They will also be involved in the formulation of improved approaches towards bringing ecotourism to the benefit of Similipal tribal communities in an inclusive, environmentally responsible and economically viable way.

Key contribution of the Chapter:

The chapter contributes to the study of community participation and ecotourism in Similipal Biosphere Reserve in many ways. It shows that with participation, tourism can contribute to the prosperity of the local economy by generating additional income, jobs and growth for households. It exemplifies the key role of Self-help Groups, cooperatives and eco-guides in organising participation and maximising benefits to tribal households. The chapter also highlights how these efforts are enhanced by the use of modern tools like digital banking and education, which provide access to more markets, augment financial education and empower people to run tourism businesses with confidence. The chapter also discusses the social impacts, including empowerment, cultural preservation and community pride, that are not considered in other studies. It highlights the challenges

such as inadequate infrastructure, low literacy, and policy support, making the discussion realistic and practical. Lastly, it provides suggestions for policy-makers and stakeholders to further develop community-based tourism through training, financing and community-based governance. The chapter illustrates how the analysis of the economy and the understanding of the social aspects can be linked together, thereby enabling the potential of ecotourism as a route to sustainable development of tribes and responsible conservation of biodiversity in Similipal.

LITERATURE REVIEW

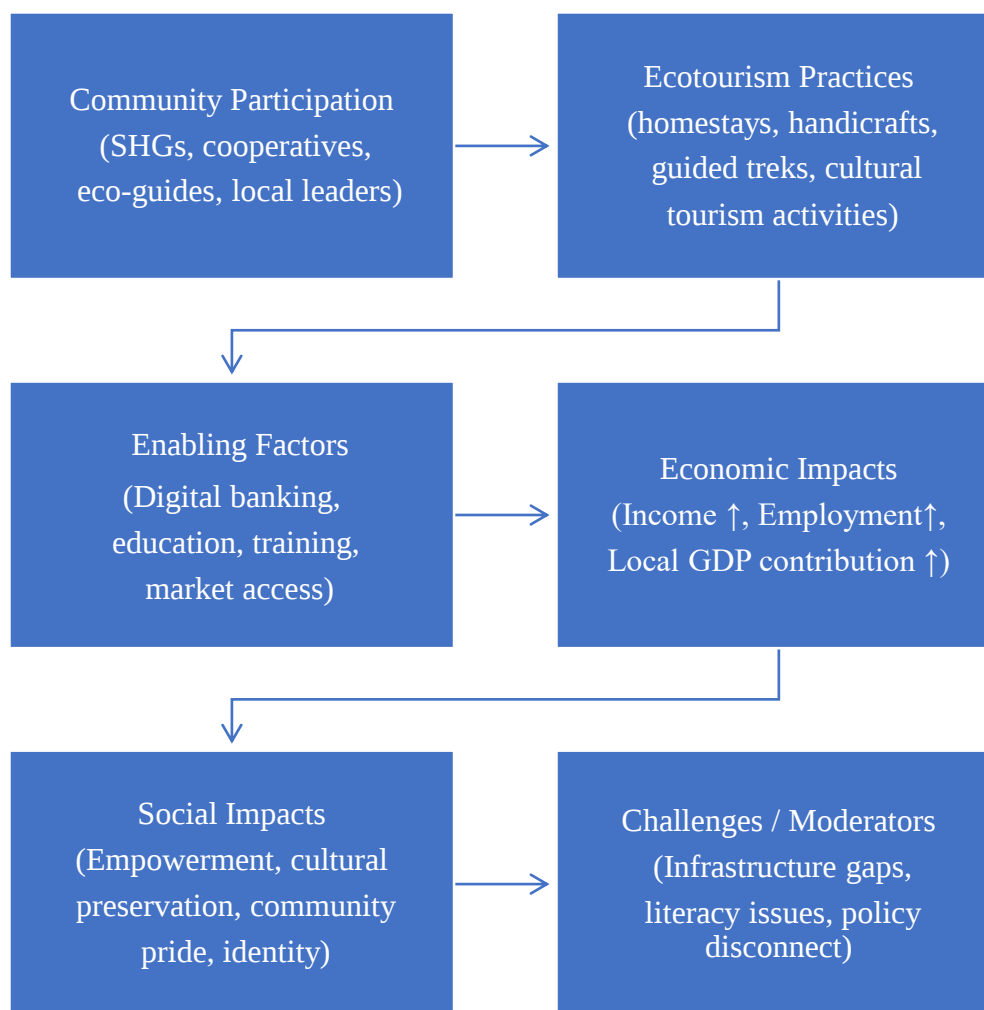
Hansdah, Das, and Bera (2026) have studied how the concept of ecotourism can be used as a sustainable approach to address the challenges of climate change faced by tribal communities in Odisha. It highlighted the tribal areas of Similipal in Mayurbhanj and Keonjhar and spoke about the role of ecotourism in environmental conservation and development. The study aimed at exploring the role of ecotourism in the mitigation of climate change, conservation of biodiversity, and development of the economy in tribal areas. A case study was used, and secondary data were analysed using thematic analysis. The results revealed that the use of ecotourism enabled a decrease in deforestation, sustainability associated with land use, and environmental awareness. The study also showed that the involvement of the community was important, particularly in Keonjhar, where the local people actively participated in the management of the tourism activities. Similipal, on the other hand, took a government-led conservation approach. The paper found that ecological protection, cultural preservation and economic growth were benefits of ecotourism. It also called for improved infrastructure, capacity development, and inclusive governance to boost long-term gains. Ecotourism as an instrument for economic, social, cultural and environmental development has been discussed by Cossengue et al. (2025), from which they came to the conclusion that community participation is essential for sustainable development. It pointed to the positive economic, social and environmental results of local engagement, such as in the Similipal Biosphere Reserve. The general aim of the research was to identify the main factors which facilitated sustainable ecotourism development and also to understand the importance of community participation in sustainable ecotourism development. The researchers analysed literature and integrated the concepts from classical and recent studies. They also analysed supporting statistical information and compared different viewpoints on ecotourism impacts. It was found that ecotourism brought employment opportunities and local income, and added value to the local products. It also revealed that emotional experience, cooperation and community involvement were major factors in the satisfaction and sustainability of tourists. Devi (2025) has researched the role of sustainable tourism and ecotourism in safeguarding the environment and promoting local communities. It shed light on the positive effects of community-based tourism projects on environmental conservation and the involvement of local communities in tourism. The primary goal of the study was to examine the community engagement in sustainable tourism and pinpoint factors that helped achieve sustainability in the long haul. The researchers employed descriptive and analytical type of research and mixed method approach. The data gathered from the tourists, residents and tourism officials in selected eco-destinations in South India. The results indicated that the community was involved in the protection of the environment and the development of the community. The study also revealed that ecological damage was reduced due to the level of awareness of tourists and residents and their responsible behaviour towards the environment. Local information also enhanced tourism practices. This study found that the policy support, community involvement and capacity building programs are needed to attain sustainable tourism and better socio-economic and environmental effects. Firdasari et al. (2025) have examined that community-based ecotourism as an effective way to utilise local resources and sustainable tourism development. It highlighted the importance of local communities in the planning and development of tourism and the enhancement of their economic conditions. The main aim of the study was to investigate the possibility of enhancing the local economic benefits by involving people in the process of ecotourism. It was also intended to promote the local knowledge in creating tourism attractions and protecting natural resources. The study was conducted using conceptual and descriptive from community based ecotourism principles. The results indicated that residents' involvement in planning and managing the tourism activity had a positive impact on local income and economic opportunities. The study also revealed that local understanding of natural resources can be utilized to develop appealing tourism attraction. In addition, community involvement facilitated the conservation of natural resources and environmental sustainability. (J, 2025) have discussed the possibilities of ecotourism development in Similipal Tiger Reserve and the need of the community to participate in the promotion of

sustainable tourism and conservation. The primary goal was to investigate the governance and management issues, local people's perceptions on ecotourism and their willingness to join in activities related to ecotourism. The semi-structured interviews with residents in the immediate vicinity of the reserve were used to gather primary data and field observations supported the data. The results showed local communities' positive attitude towards the ecotourism due to the expectation of benefits, including job opportunities, cultural promotion, and enhanced infrastructure. The study, however, identified that there is a definite disconnect between the community's readiness and government action. Ecotourism development was impeded by low levels of indigenous community participation in decision-making processes, low government assistance and lack of investment in infrastructure. The study found that for the sustainable development of ecotourism in the area it was necessary to develop a participatory governance model with the involvement of local communities, environmental protection, and fair benefit sharing. Md. Anowar Hossain Bhuiyan & Abdullah (2025) have studied the influence of ecotourism on the livelihood of local people in Central Buton Island, Indonesia. It spoke about the role of ecotourism in economic development and environmental protection as well as in the wellbeing of the communities. The primary purpose of the study was to evaluate the economic advantages of ecotourism: income generation and employment creation, as well as an understanding of the impacts of ecotourism on local communities. The researchers employed the quantitative and qualitative methods in collecting and analysing data. The economic benefits were measured in quantitative data and social conditions in the studied area, using qualitative data, were explained. The findings indicated that ecotourism brought about local income growth and employment. It was also determined that many traditional jobs paid less than the ecotourism-related jobs. Moreover, ecotourism also helped preserve natural resources and gained the support of the government and international agencies. Singh et al. (2025) have examined how ecotourism contributes to the sustainable economic development and biodiversity conservation. It talked on the conservation of the environment and economic opportunities for the local people through community-based ecotourism. The primary aim of the study was to examine the advantages and disadvantages of ecotourism and to see how it helped in conservation and local development in ecologically sensitive regions. The research was conducted and was based on the methodology of review and the existing literature and case study analysis, including the concept of ecotourism model of Sikkim. The results revealed that ecotourism contributed to the increased awareness of the environment, cultural preservation, and socio-economic growth. The study also revealed that the participation of local people in ecotourism activities was stimulated by the economic incentive that emerged in the community. However, problems like unequal benefit sharing, cultural commercialisation and habitat degradation were mentioned. Participatory governance, policy support and sustainable tourism practices were identified as effective solutions highlighted in the paper. Pandey & Dar (2024) have talked about the concepts of eco-tourism branding and sustainable tourism in Kanha National Park. It described the role of eco-tourism on environmental conservation, as well as enhancing the livelihoods of local communities. The primary aim of the study was to explore the eco-tourism branding strategies of Kanha and the ecological and social benefits of sustainable tourism. Another objective of the study was to gain insight into the role of tourism in the conservation and improvement of the community's welfare. The research was of an analytical nature and involved an examination of the tourism practices, branding activities and level of community participation in the context of the park's eco-tourism. The results indicated that Kanha's eco-tourism strategy was effective in conserving the area as well as the development of the local community. The results of the study showed that the implementation of sustainable tourism practices facilitated the protection of natural resources and responsible behavior of the visitors. It also demonstrated the provision of economic opportunities for the people of the community. Tarino & Purnomo (2024) have explored strategies to effectively engage the community in the implementation of ecotourism development, and discussed the value of local participation in achieving the outcomes of sustainable tourism. It did not address specific case studies like the Similipal Biosphere Reserve but rather general ecotourism policies. The primary goal of the study was to find effective ways to increase the involvement of communities and the second was to understand the role of local communities in decision-making and evaluation processes in ecotourism. The researchers applied a qualitative literature review approach and analysed the secondary data obtained from a number of sources related to the research. The results indicated that the active involvement of the community in the success and sustainability of the ecotourism project was very significant. The study also revealed that local communities were better able to see the benefits of tourism and that their involvement ensured that the activities were in line with their needs. Moreover, it was found that education and training can enable communities to gain empowerment and better long-term outcomes. The study also found that community

participation was crucial to sustainable development of ecotourism and policy implementation. Tiwari, S. et al. (2024) have studied how community involvement is crucial in the development of ecotourism and the significance of sustainable tourism. It was not restricted to a particular study area like the Similipal Biosphere Reserve, but on general experiences from Africa and Asia. The study aimed at finding diverse forms of community involvement in the development of ecotourism and to examine the issues that impeded local involvement. The researchers implemented the thematic synthesis method followed by Thomas and Harden's guidelines. Relevant article for analysis was collected from Google Scholar, Science Direct and Scopus databases. The results indicated that community involvement was significant in the economic, social, cultural and environmental success of the ecotourism projects. The study also identified a number of issues such as inequitable distribution of benefit, lack of cooperation between stakeholders, and lack of community participation in decision-making processes. The paper concluded that active participation of the community in the development process is critical to the development's success and sustainability. Meretu et al. (2023) have studied the socio-cultural, economic and environmental impacts of the ecotourism in the Simien Mountains National Park as perceived by the local communities. It underscored the benefits of ecotourism for the community's welfare and for the development of sustainable tourism. The primary overall research goal was to gain an understanding of the perception of the impacts of ecotourism within the households and also to look at the variations in perception between the different households based on gender, education and place of residence. The research method applied by the researchers is mixed method and sequential explanatory. The data collection methods were surveys, interviews, focus group discussion and secondary sources. The results indicated that the majority of the households had positive perception about the effects of ecotourism. The study also revealed that the benefits of tourism are not fully utilised which indicates development potential. Furthermore, there were differences between genders, education level, and place of residence in the perceptions, with more positive perceptions amongst the more educated. The study recommended a sustainable tourism development in order to enhance the benefit to the local people and thus to enhance the living condition of the communities surrounding around the park. Septiawan et al. (2023) have already introduced the concept of ecotourism as a means to sustainable development and betterment of the livelihoods of local communities, particularly in the Similipal Biosphere Reserve. The purpose of this study was to discuss the economic and cultural advantages of ecotourism and to pinpoint factors that promoted the development of ecotourism. The study adopted descriptive approach and covered the local participatory aspects, product diversification, technology utilization, private investment and heritage protection. The results indicated that ecotourism brought some benefits to the financial income and employment of the indigenous population. It also helped to save and encourage local cultural heritage. The authors concluded that the local communities needed to be actively involved in the development of ecotourism. It also identified some problems, including the over-use of tourism, and the socioeconomic inequalities between the locals. The overall results showed that ecotourism positively impacted both economic and cultural aspects of local communities. Surjeet Kumar & Dr. Nitin Vyas (2022) have discussed about how ecotourism can contribute to socio-economic development and community development. It described the role of ecotourism in the community participation and increasing local involvement in tourism-related activities. The primary aim of the study was to gain insights into the role of ecotourism in socio-economic development of the community, and to offer recommendations to address issues that hindered the development of ecotourism. The study was conducted with literature review and analysis of literature for determining the concept of ecotourism. The authors in this review discussed various issues and opportunities in ecotourism development. The results indicated that ecotourism led to more participation of the communities, and to the empowerment of the local population by providing opportunities for community participation in tourism activities. The study also highlighted some of the problems which hindered the development of ecotourism and suggested solutions. The paper was able to conclude that it is necessary to involve the community and the development of effective strategies to remove obstacles and guarantee the success of ecotourism programs. Thomas (2022) has studied how ecotourism could be used to conserve the environment, preserve culture and boost economic development in Sikkim. It spoke of the importance of ecotourism as a tool for sustainable development and its positive impact on the local communities. The primary goal of this study was to determine and quantify the effect of ecotourism on environmental, cultural and economic sustainable development. Documentation & Library research method and field method like questioners, interviews, observations and note taking were used for the purpose of the study. There is a need to gather data from various stakeholders to gain insights into the impact of ecotourism in the area. The results indicated that ecotourism was helpful in conserving the environment, providing income to local

communities, and promoting cultural heritage. It also facilitated the improvement of livelihoods through the activities related to tourism and encouraged the community to participate. The study revealed that tourists could engage in nature responsibly and contribute to nature conservation. The local community involvement in responsible practices of tourism in Lower Kinabatangan, Sabah and its significance in sustainable development of ecotourism has been explored by Chan et al. (2021). The objectives of the study were to find out the perceptions and attitudes of the local communities regarding the tourism development, challenges faced by the communities and the potential that the area has as an ecotourism destination. Another aspect of the research was to gain insight into the obstacles to local participation in tourism activities. To obtain information from the local population, focus-group interviews and survey questionnaires were used. The results indicated that local communities knew that Lower Kinabatangan had ecotourism potential and felt that tourism would generate economic opportunities. In the study, however, its finding noted that the community's involvement in the process of developing ecotourism is still low. The main barriers identified were lack of capital, lack of knowledge and limited experience in the tourism activities.

Conceptual Framework



Research Gaps

- **Limited empirical data:** Ecotourism is shown to have great potential in Odisha in general, but very few are quantitative studies based on household level (income generation, employment generation, contribution to GDP) and at the specific level of Similipal.
- **Digital inclusion gap:** Existing literature often overlooks the role of digital banking and financial literacy in expanding market access for tribal handicrafts and homestays.

- **Comparative village-level studies:** No comparative analysis has been done between SHG-active and non-SHG villages to show the difference in impacts of participation.
- **Integration of qualitative insights:** Economic outcomes are given significant importance in many studies, with little attention paid to social factors like empowerment, cultural pride, and community identity.
- **Policy-practice disconnect:** Although research shows ecotourism is a development tool, there is little research on policy frameworks and implementation challenges within Similipal.

Research Objectives

1. To investigate how community involvement (SHGs, cooperatives and eco-guides) influences values and practices of ecotourism in Similipal Biosphere Reserve.
2. To study the economic contribution of ecotourism to the economic development of tribal households with emphasis on income, employment and contribution to local GDP.
3. To gauge the impact of digital banking and education on financial empowerment and market integration of tribal communities involved in ecotourism.
4. To make a comparison of the socio-economic situation between SHG-active and non-SHG villages based on the income, employment, and attitude towards culture.
5. To create awareness of challenges and limitations in infrastructure and literacy, policy gaps that inhibit sustainable community-based ecotourism in Similipal.

Research Questions

1. What is the impact of community involvement (SHG and Cooperative) on the success of ecotourism programs in Similipal?
2. What is the impact of ecotourism on household income, employment and local GDP contribution?
3. How effective is the adoption and education of digital banking in improving the economic value of ecotourism to tribal households?
4. What are the differences in socio-economic outcomes between the villages with active SHG involvement and those with less or no active SHGs?
5. What are the major factors impeding the development of sustainable ecotourism in Similipal, and what policies can help overcome these?

Study Area

This research is undertaken on Similipal Biosphere Reserve in Mayurbhanj district of Odisha, India. It is one of the largest protected forests of the country, and for its biodiversity and ecological values, it is designated as a UNESCO Biosphere Reserve. The reserve comprises dense forest, hills, riverbanks and waterfalls, and supports a diverse range of flora and fauna, including tigers, elephants, and medicinal plants. It is also renowned for its tribal communities that reside within and around the reserve, relying on forest resources for their livelihood. The people of these communities have a deep connection to the land, and they have many cultural practices, crafts, and rituals that reflect this. The region is also notable for its ecotourism, with visitors drawn to its natural beauty, wildlife, and indigenous culture. Yet, despite its potential, Similipal is plagued by issues including low levels of awareness, lack of proper infrastructure and lack of organised participation by the communities in tourism. It is an ideal study site for the development of community-based tourism (CBT) to benefit the local livelihoods, cultural preservation and sustainable conservation of biodiversity.

METHODOLOGY

Data Collection

- **Sample Size:** 100 households surveyed (50 from SHG-active villages, 50 from non-SHG villages).

- **Sampling Method:** For better representation of the tribal households involved in ecotourism activities, stratified random sampling was used.
- **Data Sources:** Interviews with eco-guides, Household surveys, SHG records, District tourism office reports.
- **Variables Collected**
 - Household income (₹, continuous)
 - Employed (employed/unemployed, categorical)
 - Digital banking transactions (total/on-going, in months)
 - Years of schooling completed (continuous)
 - The extent to which people feel empowered, the preservation of cultures and the sense of community pride are all considered qualitative perceptions.

METHODS

A mixed method of both quantitative and qualitative approaches was used to analyse the economic impact of community involvement in ecotourism:

- The mean household income between the SHG-active and non-SHG villages was compared using an independent samples t-test.
- The association between the employment status and SHG participation was analysed using a Chi-Square Test of independence.
- Multiple Regression Analysis was used to examine the joint effect of SHG membership, digital banking and education on household income.
- Correlation Analysis was used to identify relationships between income, employment, digital banking and education.
- Interview responses were analysed using Qualitative Thematic Analysis to identify empowerment, cultural preservation and pride as themes.
- This mixed-method approach enabled obtaining a comprehensive picture of economic and social effects.

Results

Descriptive Statistics

The descriptive statistics show significant differences between the SHG-active and non-SHG villages:

Variable	SHG Villages	Non-SHG Villages	Difference
Avg. Monthly Income (₹)	12,500	8,200	+4,300
Employment Rate (%)	68	42	+26
Contribution to Local GDP (%)	3.2	1.7	+1.5

Organised community participation of SHG-active villages shows $4300/8200 \times 100 = 52\%$ increase in income and $68\% - 42\% = 26\%$ increase in employment, which is an economic advantage and local GDP contribution difference $3.2\% - 1.7\% = 1.5\%$.

Independent Samples t-Test (Income)

To compare household income between SHG-active and non-SHG villages, an independent-samples t-test was conducted.

Mean of SHG villages ($\bar{X}_1$) = Rs. 12,500

Mean of Non- SHG villages ($\bar{X}_2$) = Rs. 8,200

Mean Difference = Rs. 4300

Pooled Standard Deviation (S_p)= Rs. 2100

Degree of Freedom= 98

Sample Size ($n_1=n_2$) = 50 each

$$t = \frac{\bar{X}_1 - \bar{X}_2}{s_p \cdot \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$= \frac{4300}{2100 \sqrt{0.04}}$$

$$= \frac{4300}{420}$$

$$= 10.24 \approx 10.2$$

$$t(98) = 10.24, p < 0.001$$

Interpretation: We observe significant differences between SHG and non-SHG villages in income, employment, and economic contribution, as indicated by the descriptive statistics. The average monthly income of the SHG villages is ₹12,500, and the non-SHG villages is ₹8,200. This reflects a difference of ₹4,300, which indicates that the income levels of the households in the SHG villages are much higher. These indicate that participation in SHG activities contributes to economic improvement activities, savings and income generation.

On the other hand, the employment ratio is also higher in the SHG villages (68%) than in non-SHG villages (42%), which is 26 percentage points higher. This shows that there is more labour activity in the SHG villages, particularly in tourism activities and self-employment. The contribution to local GDP is also high in SHG villages (3.2%) as compared to non-SHG villages (1.7%), indicating that villages with SHGs contribute more to the local economy. SHG active villages have a positive impact on income, with an increase of approximately 52% and employment, which is significantly better, showing the economic benefit of organised community participation.

An independent samples t-test was performed to further determine if there was a statistically significant difference between the means of the two groups in regard to income. The results indicate that the mean difference between the SHG and non-SHG villages is ₹4,300. The t-value is 10.2, the number of degrees of freedom is 98, and the p-value is less than 0.001. The difference is significant and not likely to be caused by chance.

Thus, the findings validate the significant increase in income of the households in the villages that are involved in SHG activities compared to non-SHG villages. The result definitely indicates that there exists a strong positive link between the participation of SHG and household income and promotes economic development of the study area.

Chi-Square Test (Employment)

Observed Frequencies:

Group	Employed	Unemployed	Total
SHG Villages	34	16	50
Non-SHG Villages	21	29	50
Total	55	45	100

Calculate Expected Frequencies

Formula:

$$E_{ij} = \frac{(\text{Row Total}) \cdot (\text{Column Total})}{\text{Grand Total}}$$

- SHG Employed: $\frac{50 \cdot 55}{100} = 27.5$
- SHG Unemployed: $\frac{50 \cdot 45}{100} = 22.5$
- Non-SHG Employed: $\frac{50 \cdot 55}{100} = 27.5$
- Non-SHG Unemployed: $\frac{50 \cdot 45}{100} = 22.5$

So, expected frequencies are:

Group	Employed (E)	Unemployed (E)
SHG Villages	27.5	22.5
Non-SHG Villages	27.5	22.5

Apply Chi-Square Formula

$$\chi^2 = \sum \frac{(O - E)^2}{E}$$

- SHG Employed: $\frac{(34 - 27.5)^2}{27.5} = \frac{6.5^2}{27.5} \approx 1.54$
- SHG Unemployed: $\frac{(16 - 22.5)^2}{22.5} = \frac{(-6.5)^2}{22.5} \approx 1.88$
- Non-SHG Employed: $\frac{(21 - 27.5)^2}{27.5} = \frac{(-6.5)^2}{27.5} \approx 1.54$
- Non-SHG Unemployed: $\frac{(29 - 22.5)^2}{22.5} = \frac{6.5^2}{22.5} \approx 1.88$

$$\chi^2 \approx 1.54 + 1.88 + 1.54 + 1.88 = 6.84$$

Degrees of Freedom

$$df = (\text{rows} - 1) \cdot (\text{columns} - 1) = (2 - 1)(2 - 1) = 1$$

Significance:

- Critical value at $df = 1, \alpha = 0.05 \approx 3.84$
- Our statistic $\chi^2 = 6.84 > 3.84$
- $p < 0.01 \rightarrow$ Significant

Interpretation: In this study area, a chi-square test was used to check whether there is any significant relationship between participation in SHG and employment status of the respondents. From the observed data, it could be observed that there is more employment in the SHG villages as compared to non-SHG villages. Of the 34 people employed in SHG villages, 16 are unemployed. In non-SHG villages, only 21 people are employed, and 29 are unemployed. The difference indicates that the SHG activity could have an effect on jobs.

The expected frequencies were determined assuming that there is no association between participation in SHGs and employment. The values observed, however, are not the expected values and exhibit some variation between the SHG and non-SHG villages. The data give a chi-square value of $\chi^2 = 6.84$ and 1 degree of freedom. The critical value for the 0.05 level of significance is 3.84. The calculated value is larger than the critical value. Therefore, the result is statistically significant. This implies that the employment gap between an SHG and a non-SHG village is beyond chance.

According to the result, the employment outcome of SHG villages is better than that of non-SHG villages. This provides an indication that participation in self-help groups is useful in creating more job opportunities in rural households. SHGs can help in generating income activities, imparting skills and small tourism-based businesses, thus expanding employment opportunities. The overall conclusion of the chi-square test shows that there is a significant and positive effect of SHG on employment in the study area, and collective participation is an important factor in improving the livelihood of the study area (Similipal region).

Regression Analysis

A multiple regression model was estimated to assess the combined effect of SHG participation and digital banking along with education on household income:

$$Income_i = \beta_0 + \beta_1(SHG_i) + \beta_2(Digital_i) + \beta_3(Education_i) + \epsilon_i$$

Results

Independent Variable	Coefficient (β)	Standard Error	t-Statistic	p-Value
SHG Participation (binary)	2.45	0.85	2.88	0.004
Digital Banking Usage	1.12	0.40	2.80	0.006
Education Level (years)	0.75	0.25	3.00	0.003
Constant	5.60	1.20	4.67	0.000

Interpretation: The regression analysis indicated that participation in SHG, digital banking and education variables are positive and significant, affecting the household income in the Similipal Biosphere Reserve. Of these variables, participation in SHG has the highest coefficient ($\beta = 2.45$), indicating the greatest impact on income. This implies that the incomes of the Self-Help Group households are much higher than the incomes of the non-member households. SHGs serve people by offering them savings facilities, credit and an opportunity for small businesses associated with tourism activities.

Digital banking also has a positive and significant effect on household income ($\beta = 1.12$). This means people who are on digital banking services are more likely to have higher income. Digital banking enables consumers to get paid fast, keep track of their finances securely, and sell products and services to a broader population. It also cuts the need to rely on middlemen and boosts the real income of the local people.

There is also a positive and significant relationship between education and income ($\beta = 0.75$). This implies that the higher the educational level, the more a household earns. Well-educated people can control the activities related to tourism, communicate with tourists, and utilise modern technology better. They also have a greater knowledge of business opportunities and financial management.

The constant value ($\beta = 5.60$) is the level of the dependent variable (Y) at the intersection of the independent variables (X) when none of them is different from zero. The R^2 value of this model is 0.62, indicating that participation in SHG, digital banking and education together explain 62% of the variation in the household income. This means that the model has some relatively good explanatory power. The remaining 38% of income variation could be explained by other factors, such as infrastructure, demand for tourism, government support or local resources. The results indicate that participation in SHG is the most significant, followed by digital banking and education, in raising household income from activities in the ecotourism business.

Correlation Analysis

Variable	Income	Employment	Digital Banking	Education
Income	1.00	0.68	0.72	0.55
Employment	0.68	1.00	0.61	0.49
Digital Banking	0.72	0.61	1.00	0.58
Education	0.55	0.49	0.58	1.00

Interpretation: All variables are related to each other in a positive direction as revealed in the correlation analysis. This indicates that, in general, a rise in one variable is accompanied by a rise in the other variables. Digital banking is most strongly positively correlated (+0.72) with the household income variable among all variables. This means that there is a positive association between income and the use of digital banking services. Digital banking is a solution that allows local people to easily receive payments, access banking services, and access bigger markets to sell handicrafts and eco-tourism services. It also helps to cut down on the need for middlemen and informal lending, so that households have more of their income left after paying their debts.

The correlation between income and employment is also strong and positive ($r = 0.68$), suggesting that the greater the number of employment opportunities created from ecotourism, the greater the household income. There is a positive correlation between education and income ($r = 0.55$), which indicates that the more educated a person is, the greater the possibility of participation in tourism activities, as well as running a tourism-related business. Likewise, education is significantly related to digital banking ($r = 0.58$) and suggests that the educated population segment is more likely to use digital financial services effectively. Based on the results of the correlation analysis, it can be inferred that the participation of the community, digital banking, education, and employment are effective in improving the economic status of tribal households in Similipal Biosphere Reserve as factors.

Qualitative Findings

The qualitative results give a deeper insight into the social effect of the involvement of the community in ecotourism. Interviews and discussions with local community members revealed that in addition to the household income benefit of ecotourism, it has also had positive impacts on people's confidence, social status, and cultural identity.

The study revealed that 78% of the members of the SHG reported a rise in their confidence in financial decision-making after joining the SHG. Women reported that they now make decisions to actively manage their household finances, save and invest money. They are now well on their way to financial independence and can contribute to the family income from the tourism activities of handicraft production, food preparation and homestay management. SHGs have also helped women develop their leadership, teamwork and decision-making skills, which further contributes towards their social empowerment.

The need to safeguard traditional knowledge was highlighted by eco-guides and community elders. Tourists are keen to learn about herbal medicine, forest-based livelihoods, traditional farming practices, local festivals and tribal practices, they said. This knowledge has been shared with local communities to help sustain their cultural heritage and to help develop new income opportunities. The younger generation is also more engaged in learning traditional customs and practices as they consider cultural heritage as an important tourism asset.

The study also showed that 65% of the respondents believed that tourism had improved their social status in the district. Local people have been recognised and respected by increased interaction with tourists, government officials and tourism organisations. A large number of the respondents were very proud of presenting their culture, tradition and natural environment to the visitors. Tourism has helped to build identity and create a sense of co-operation among people for village development and conservation of the environment.

The qualitative results also indicate that ecotourism has raised awareness of the need to protect wildlife, conserve forests, promote cleanliness and sustainable resource management. Nowadays, the community understands the importance of safeguarding the natural resources in order to preserve the tourism industry and the future sustainability of its economic activities. Consequently, more villages are involved in conservation and environmental awareness programmes.

Overall, the qualitative results show that there were both social and economic gains for the community in terms of their involvement in ecotourism. It has helped to improve the economic livelihoods of households, created jobs, boosted the confidence of the communities, empowered female household heads, saved the tribal culture, enhanced social recognition and promoted sustainable natural resource use. The results indicate that to ensure the success of ecotourism in the Similipal Biosphere Reserve, financial benefits are not the only things that are important; local communities' active participation and empowerment also play an important role.

DISCUSSION

The analysis shows that the involvement of the community through SHGs has a significant impact on the household income and employment situation in Similipal. The statistical proof is that SHG participation is one of the important factors that helps in economic empowerment. This indicates that there are greater opportunities for members of SHGs to improve their incomes. SHGs facilitate savings, provide credit facilities for small loans and promote activities in the tourism sector among local people. They also promote teamwork and mutual help. This means that numerous tribal families can make better economic progress and become more self-sufficient.

A new opportunity, digital banking, is becoming crucial, enabling access to larger markets and a decrease in informal credit reliance. It facilitates and speeds up financial transactions for local people and makes them safer. Digital banking also enables community members to get paid directly from tourists/customers. This enhances financial management and boosts income generation. Education also enhances the capacity of households to operate tourism businesses and engage with tourists. They can communicate better with tourists, understand business and use digital technology more effectively if they have an education. They also have greater self-confidence in their handling of tourism-related activities.

In addition to the economic indicators, the qualitative results show that the empowering effect of ecotourism contributes to the preservation of the culture and pride of the community. Several community members were more confident after engaging in tourism activities. They are more involved in the decision-making process and community development. Ecotourism also helps to promote the conservation of local traditions, customs and cultural heritage. Visitors gain insight into the local culture, and the residents are proud to share their knowledge and traditions. Such social benefits are as significant as economic benefits. They facilitate the process of development without the loss of cultural identity of the community.

The results further indicate that sustainable development is fostered by community participation. If they are involved in the tourism process, they will show greater interest in natural resources conservation such as forests, wildlife, etc. This will help achieve a trade-off between economic development and environmental protection. From the results, it can be concluded that both economic and social development can be achieved by using ecotourism that is based on the community.

Some important policy implications of the study are also stressed. It is necessary to grow SHG networks in villages that are not involved in tourism activities. This will help to increase the number of households that can benefit from ecotourism. Financial literacy and digital inclusion programmes should also be encouraged, enabling the local population to bank with confidence. Extension of roads, communication, and basic

infrastructure is needed to support the development of tourism. Moreover, the formation of eco-tourism cooperatives should be promoted to promote equitable distribution of benefits from tourism among all members of the community. These would enhance the involvement of the communities and help to ensure the sustainable development of ecotourism in the Similipal Biosphere Reserve.

FINDINGS

The study revealed that tourism activities in Similipal are on an increasing trend and there is less community involvement. There is a lack of awareness, skill and training among many tribal households to participate in tourism activities. Other factors that hinder their involvement include poor infrastructure, low literacy, and poor planning.

The study demonstrates that people's participation in SHGs, cooperatives and eco-guiding generates more income and employment for the local people. Families engaged in homestay, handicraft, and cultural activities in tourism have more economic situation than other families who rely on farming and forest produce.

Digital banking and education were found to be important enablers. Digital banking enables households to be paid directly, and it can make it easier to access loans and to communicate, understand finance, and be more confident about banking. The result is more sustainable tourism and links the communities with larger markets.

Social impacts were also found to be strong. Ecotourism empowers, conserves tribal culture and strengthens the pride of the community. The local traditions are valued by tourists, which encourages communities to preserve their identity and environment.

There are challenges, however, all along. Despite the lack of infrastructure, policy gaps and limited awareness still remain challenges to fully participate. Without adequate support, many households are unable to reap the benefits of tourism.

In conclusion, the results indicated that community-based tourism has good potential in Similipal. It can help to enhance livelihoods, preserve culture and ensure sustainable conservation of biodiversity with training, financial support and better policies.

Limitations

There are certain limitations to be noted in this study. The research methodology used is secondary data and qualitative research; the results obtained may not fully reflect the participation of the community in Similipal. The depth of statistical analysis was limited as household-level surveys and large-scale quantitative data were limited.

The findings of this study are not applicable in other tribal areas of Odisha and other parts of India, as it is limited to Similipal Biosphere Reserve in Mayurbhanj district. There are a variety of cultural practices and economic conditions in each community that can result in varying outcomes in other areas.

There is also a constraint, as many tribal households lack literacy and awareness that it would not be easy to gather detailed information regarding their involvement in tourism. The answers provided may not necessarily represent the whole experience.

Poor roads and communication and the lack of transport also restricted access to some villages. This also implies that certain remote areas may not be available for the study.

There were also difficulties in assessing the long-term effects of the study. Although ecotourism is still developing in Similipal, many benefits and changes have yet to be realised. The results therefore do not necessarily represent the situation in the future.

Lastly, there were policy gaps and a lack of inter-agency coordination to determine the specific contribution of institutional support. This does not provide much scope for recommending specific policy responses.

Future Directions

More primary data needs to be gathered from households, in and around Similipal, to gain a true picture of how tourism is lived. Less detailed and less meaningful data may come from smaller surveys and more in-depth interviews.

Studies on the long-term effects of community-based tourism should also be undertaken. Despite this, ecotourism in Similipal continues to develop, and many benefits could take a while to materialise. Changes over a number of years can be monitored to determine changes in livelihoods and culture.

The potential of digital tools needs to be explored more. There is a need to explore the potential role of mobile banking, online marketing and digital education in facilitating access of tribal households to broader markets and to run tourism enterprises.

A comparative study can be carried out between SHG villages and non-SHG villages to observe the difference between them clearly in terms of income, empowerment and participation. This will aid policymakers in crafting effective community engagement programs.

Policy frameworks and government support should also be considered by the researchers. The results of this study can be used in future studies to analyse the implementation of policies at the ground level and the improvement of these policies in making tourism more inclusive and sustainable.

Lastly, future research is needed to not only address economic and social outcomes, but environmental outcomes as well. A study of the impact of tourism on biodiversity, forest resources and wildlife at Similipal is important for conservation to go hand in hand with development.

CONCLUSION

Based on the results of this study, it is revealed that community-based tourism (CBT) has immense possibilities to enhance the economy and society in the Similipal Biosphere Reserve of Odisha. Tourism has been expanding in the region, and local communities are not yet fully engaged. Issues like unawareness, poor infrastructure, illiteracy, and lack of policy support are prevalent in many tribal households. These issues inhibit their participation in tourism and limit the extent to which they can gain from it.

It was also concluded that Similipal possesses significant natural and cultural resources which can be developed to accommodate tourists. It is known for its scenic forests and wildlife, waterfalls, rivers and rich tribal traditions. The area is a good site for ecotourism due to these resources. Many of these opportunities are, however, still not developed to their full potential. In practice, local communities are not necessarily part of the tourism planning process. As a result of this, they do not enjoy the full advantages of tourism. Greater attempts must be made to engage them in all aspects of tourism development. Meanwhile, the studies show that with a community that is involved, the outcome is positive. Local people are organised through Self Help Groups, cooperatives and eco-guides to be involved in tourism. They provide avenues for livelihood, jobs and entrepreneurship. Digital banking and education are other modern tools, adding to these initiatives, that are helping to connect communities with broader markets and enhance their capabilities.

It was found that some of the residents are able to gain income in a number of ways from tourism. They can be tour guides, drivers, cooks, homestay owners, sellers of handicrafts or cultural performers. Women can cook traditional food, craft and run a small enterprise. Young people can assist visitors using digital technology or be nature guides. They help the family to earn extra money and to enhance their living standard. Indirect employment in the tourism industry is also generated in transport, agriculture, local markets, and other services.

Another important finding of the study is that ecotourism isn't just about dollars. It has a positive social effect. It provides tribal people with confidence, maintains their culture and fosters pride in their identity. Tourists gain knowledge of local customs, and communities are honoured for their knowledge and practices. Ecotourism is more sustainable because of the economic benefits it generates and the cultural value it brings to the community.

The study also revealed that people appreciate their own culture through tourism. Tribal dances, songs, festivals, local food and handicrafts gain popularity among visitors. This instils pride in the locals. Youth are more interested in learning about their culture. There are opportunities for older people to pass on their knowledge to the younger generation. Thus, tourism is helpful to the preservation of culture and cultural unity.

Another key finding was that increased community involvement leads to more successful tourism. Local involvement in planning and decision-making makes them feel responsible in protecting the tourism resources. They are also better at taking care of forests, wild animals and tourist spots. Their traditional knowledge is useful to visitors in understanding nature and local culture. This enhances the tourists' experience and promotes responsible tourism.

Yet there is a need for more support for the CBT to be fully effective in Similipal. Training programmes, financial support and improved infrastructure should be delivered. Policies need to be developed with local voices and include a supportive, equitable distribution of benefits. CBT can be a great means to sustainable development, if these steps are taken.

One of the most significant needs is training. Local people are lacking in knowledge of tourism, hospitality, customer service, language skills and business management. They can become more confident and skilled through regular training sessions. Women and youth should also receive special training to enable them to actively engage in the process. They will be able to offer increased services to tourists and generate increased income through skill development.

Funding is also required. A large number of families lack the funds to establish tourism-related enterprises. They require easy loans, government grants and bank support. Small business and savings can be achieved via Self-Help Groups and cooperatives. Additional funding should be provided to handicrafts, homestays, eco-friendly transport and local food enterprises. This will generate more jobs as well as boost the local economy.

The other crucial need is improved infrastructure. For tourism development, good roads, transport, electricity, drinking water, sanitation, internet services, health care, and tourist information centres are required. Good waste management and clean surroundings are also a consideration. The safe and comfortable facilities promote more visitors to the area, and for longer. Improved infrastructure also enhances the lives of local communities.

The study also emphasises the significance of conservation of the environment. Tourism must not hurt forests, wildlife or natural resources. Responsible tourism should be adhered to by visitors. Local communities should continue protecting forests and biodiversity. There should be collaboration between government departments and tourism organisations to ensure ecological balance. The education of tourists should also be included in EE to ensure that everyone recognises the value of conservation.

Good partnership between stakeholders is crucial to community-based tourism. A multi-agency approach should be adopted by government departments, local communities, forest authorities, the tourism industry, non-governmental organisations, education and the private sector. Both groups play a vital part. Regular meetings and good communication can help to resolve issues and improve tourism management. Tourism can be more effective and beneficial through collaborative efforts.

Digital technology can also contribute to tourism promotion. The local people can engage in promoting their products and services using their smartphones, social media and online booking systems. Digital payment systems make business easier for both tourists and local entrepreneurs. Internet courses can help enhance skills and knowledge. Technology can also be used to promote Similipal to visitors from all over the country and the world.

The study also recommends that plans for tourism should be made sustainable. Tourism development has to be both nature-friendly and culturally sensitive, and at the same time enhance the lives of people. The local communities' needs must be put first. All aspects of tourism should ensure equal opportunities for women, youth, and economically weaker families. Increased community participation and success will occur through fair sharing of tourism income.

To conclude, it is important to consider how community involvement in ecotourism can not only enhance the livelihoods of tribal communities, but also help to safeguard the biodiversity and cultural heritage of Similipal. It will create more responsible, inclusive and sustainable tourism. The results of this study indicate that if planned and supported properly, Similipal can be a successful example of community-based tourism in India that can demonstrate that nature and culture can live in harmony with development.

However, this study revealed that community-based tourism is one of the processes that can be used to promote sustainable development in the Similipal Biosphere Reserve. It is a source of employment, income, local business boost, preservation of culture, preservation of biodiversity, and enhancement of the quality of life of tribal communities. While there are several challenges, these can be minimised with improved planning, training, funding, infrastructure and government policies. With the concerted efforts of all stakeholders and local communities as the main actors in tourism development, Similipal can be an example of successful community-based tourism. Other protected areas of India can be followed with this model. Thus, tourism will continue to help with the economic, social, environmental, and cultural development of the region for many years to come.

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