Journal of Agriculture and Environmental Sciences

Research Article

Assessment of ecotourism as a sustainable development pathway for local communities in Semien Mountain National Park, Ethiopia

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Received: October 20, 2025; Accepted: November 21, 2025

Abstract: *Protected areas are essential for biodiversity conservation and serve as major tourism assets, particularly in developing countries such as Ethiopia. This study provides an integrated assessment of ecotourism as a sustainable development pathway in the Simien Mountains National Park. It examines stakeholder participation, resource potential, market dynamics, and sustain-ability outcomes by exploring the roles of ecotourism associations and local beneficiaries. Key natural and cultural attractions are identified, and market segmentation was analyzed to under-stand visitor characteristics and motivations. Environmental and socioeconomic impacts are assessed alongside the main ecotourism activities and income sources that support local livelihoods. Data were collected from 128 respondents using a mixed-method approach that combined quantitative surveys and qualitative interviews. Quantitative responses were evaluated using a five-point Likert scale to measure agreement on benefits, challenges, and sustainability issues, while qualitative insights provided a deeper understanding of conservation attitudes and community involvement. Moreover, Focal focus group discussions and secondary data were used for further triangulation of ecotourism's contribution to environmental protection and livelihood improvement. Findings showed that ecotourism was the second-largest income source for local households after crop and livestock production, with more than 7,000 individuals directly benefiting. Respondents identified village tourism (70.35%), adventure tourism (70%), wildlife and bird watching (68.7%), and trekking (66.4%) as key opportunities. Challenges include weak organizational structures (69.6%), limited tourism activities (64.7%), and inadequate facilities (58.6%). Negative impacts perceived include seasonality (79%) of the job, cultural disruption (62.13%), and local inflation (50.1%). Tourist numbers increased from 1,289 in 2000 to 27,980 in 2017, with revenue rising from 230,000 ETB to 23.6 million ETB. Overall, ecotourism contributes to foreign exchange earnings, employment, and infrastructure development. Strengthened collaboration among government, NGOs, and local communities is recommended to ensure long-term ecotourism development to minimize threats such as seasonality of jobs, cultural erosion and local inflations perceived by the local communities in the park.*

Keywords: Ecotourism activities, Biodiversity conservation, Natural and cultural attraction, Wildlife

Citation: Mengstie N.E. and Desta G.T. (2025). Assessment of ecotourism as a sustainable development pathway for local communities in Semien Mountain National Park, Ethiopia. *J. Agric. Environ. Sci.* 10(2): 88-110 https://doi.org/10.63990/jaes.v10i2.12785

1. Introduction

Protected areas play a crucial role in conserving biodiversity, preserving ecosystem services, and safeguarding cultural and natural heritage. In many developing countries, they also serve as foundations for ecotourism, offering pathways to both environmental protection and local socioeconomic development (Eagles *et al*., 2002; Honey, 2008; Dudley *et al*., 2010; Leung *et al*, 2018). One such example is Ethiopia's Simien Mountain National Park (SMNP), which is a UNESCO World Heritage Site recognized for its unique high-altitude ecosystems, dramatic landscapes, and endemic species, including the Walia ibex, Ethiopian wolf, and Geladas (UNESCO, 2018). SMNP is located in the Amhara Region of northern Ethiopia, approximately 412 km², ranging from 1,900 to over 4,500 meters above sea level. Its diverse habitats from montane forests to Afro-alpine meadows place it within the Eastern Afromontane biodiversity hotspot (Mittermeier *et al*., 2011), offering significant tourism potential where ecotourism might generate sustainable benefits for both nature and people around the area (JICA, 2014; AWF and EWCA, 2018; UNESCO World Heritage Centre, 2021; FAO Mountain Partnership, 2023).

Ecotourism has emerged as a strategic development option for local communities in SMNP. Although the park faces increasing pressures from habitat encroachment, overgrazing, vegetation degradation, and unsustainable resource use (Abate, 2017; Hassen, 2018; AWF/EWCA, 2019). Moreover, infrastructural limitations, human–wildlife conflicts, and environmental degradation from poorly regulated tourism activities threaten the long-term sustainability of both ecosystems and livelihoods (Ogweno, 2021; Kimani, 2015). These challenges underscore the need for empirical assessments that measure how effectively ecotourism functions as a tool for sustainable development in protected areas.

Ecotourism is increasingly promoted in Ethiopia as a tool to link conservation with livelihood enhancement (Biniam and Ferede 2020; Tessema, 2021; Tesfaye and Tessema, 2025). Community-based ecotourism initiatives across the country, such as in Wunania-Kosoye, Guassa, and Adaba-Dodola demonstrate efforts to integrate biodiversity protection with economic empowerment and cultural preservation (Teshome *et al*., 2015; Gebreegziabher, 2016; Mamo and Wube, 2018). In SMNP, ecotourism has grown substantially, with visitor numbers and revenue rising due to improvement in infrastructure development, improved access, and increasing global interest in nature-based travel (EWCA, 2020; IUCN/WHC, 2020; JICA, 2016).

Local communities have benefited from ecotourism through employment in guiding, lodging, mule services, and handicrafts. Revenues contribute not only to household income but also to national goals—generating foreign exchange, supporting GDP growth, and stimulating investment in infrastructure (Honey, 2008; UNEP, 2021). This is particularly important in a rural context, where traditional livelihoods (farming and livestock rearing) are vulnerable to environmental shocks and market instability (Moges and Tolemariam, 2020; Tofu *et al*, 2023). This study aims to assess ecotourism as a sustainable development pathway for local communities in SMNP. It explores the sector's economic, social, and environmental contributions and highlights the barriers preventing it from reaching its full potential and proposes practical strategies for improvement. Specifically, it examines local livelihoods, tourist inflows and benefits, community perceptions, and systemic constraints, in order to inform recommendations for more effective ecotourism policy and practice in Ethiopia. The findings will contribute to academic discourse on conservation-based development and offer evidence-based recommendations for policymakers, conservation practitioners, and community stakeholders in Ethiopia.

2. Materials and Methods

2.1. Description of the study area

The study was conducted in SMNP, located 840 km from the capital city, Addis Ababa and 120 km northeast of Gondar, northern Ethiopia. It lies between geographic coordinates of 13° 06' 44.09" to 13° 23' 07.87" N latitude and 37° 51' 26.66" to 37°23°45" longitude (Fig. 1). It was gazetted as a National Park in 1969 with a total area of 136 km^2. Simein Mountain National Park is a known for its unique biodiversity, dramatic highland scenery, and endemic species such as the Walia ibex (*Capra walie*) and the Ethiopian wolf (*Canis simensis*). The park is a major ecotourism destination and supports

thousands of residents through tourism-related activities.

2.2. Study design

This study employed a mixed-methods research design, combining both quantitative and qualitative data collection and analysis techniques. The use of a case study approach was deemed appropriate to explore the complex and context-specific dynamics of ecotourism in SMNP. This approach enables the investigation of real-life phenomena within their environmental, social, and economic contexts (Erbaş, 2019; and Yin, 2018), and it is widely used in tourism and development research where multiple variables interact (Veal, 2011; Mason *et al*., 2021; Azer *et al*., 2022).

2.2.1. Mixed-methods design

The mixed-methods design was selected to integrate statistical evidence (e.g., income levels, tourist flows, infrastructure growth) with qualitative insights from local stakeholders (community members, park officials, service providers). This triangulation of data strengthens the validity of the findings and allows for a more understanding of both the measurable impacts and subjective experiences related to ecotourism development (Creswell and Plano Clark, 2017).

2.2.2.Quantitative data

Quantitative data were collected through structured questionnaires administered to local respondents, selected using a stratified random sampling method to ensure representation, occupation, and proximity to the park. The data were analyzed using SPSS software, with frequency distributions and descriptive statistics used to summarize patterns related to income sources, employment, and perceived economic benefits from ecotourism.

2.2.3.Qualitative data

Qualitative data were obtained through semi-structured interviews and focus group discussions (FGDs) of 85 individuals who participated in three separate FGDs with local elders, tour guides, accommodation providers, and officials from the Ethiopian Wildlife Conservation Authority (EWCA). These data were thematically analyzed to explore stakeholder perspectives on opportunities associated with ecotourism in SMNP. Focus group discussions are aimed to gather at gathering in-depth qualitative data on participants' perceptions of the economic, socio-cultural, and environmental impacts of ecotourism, particularly as a development opportunity for local communities (e.g., livelihood diversification, cultural preservation). Participants were specifically chosen for their local knowledge and direct involvement in tourism activities, ensuring rich and context-specific insights.

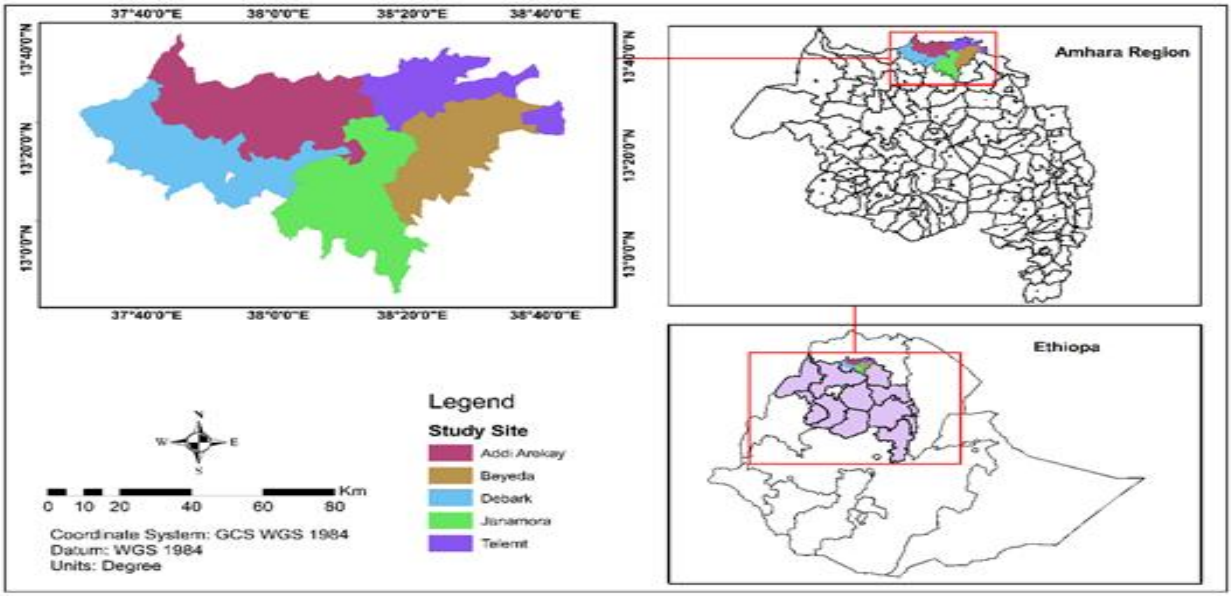


Figure 1: Map of Simein Mountains National Park (Source: Author's own)

2.2.4.Index and sample size formula

Diversification of livelihoods and sources of income among local communities are computed using the index formula:

$$\text{Index} = 4F1 + 3F2 + 2F3 + 1F4 \text{ individual}$$
$$\text{or } \sum(4F1 + 3F2 + 2F3 + 1F4 \text{ all variables}$$

Where: F1 = Frequency of first-order ranking, F2 = Frequency of second-order ranking, F3 = Frequency of third-order ranking and F4 = Frequency of fourth-order ranking

Sample size and sample determination: The sample size was determined using Yemane's (1967) formula, resulting in a target of 142 respondents using the following formula:

no ≥ ((1.645)^2 (" " 0.30)(0.70))/((0.05) ²)
=0.8067/0.0025=≥ 227.30 ≈228

But the study population is less than 10000 individuals

n =" " (" " n" ")/(1"+" n/(spz(N))) " "
=(" " 228" ")/(1"+" 228/378) "=" 142

Where:

No - is the desired sample size when the population is greater than10, 000 n - Is the number of samples size when the population is less than10, 000 (applicable here) p - The estimated proportion of an attribute that is present in the population

z - Is 90 % confidence level, i.e. Z=1.645
q =1-p. The value for Z is found in statistical tables, which contain the area under the normal curve.
e - Is margin of error or degree of accuracy?
N-is total number of populations (Yemane's formula)

Yamane's (1967) method has been consistently used in social science and population-based research to ensure adequate representation (Cochran, 1977; Kothari, 2004). This approach provides a reliable means of determining appropriate sample sizes, especially for surveys involving a finite population, and helps minimize sampling error while maintaining practical feasibility (Saunders et al., 2019; Israel, 1992). Based on the formula, a total of 142 respondents were selected for the study, and questionnaires were administered accordingly. However, nine questionnaires were not returned due to unreachable conditions in the environment. Consequently, only 128 valid questionnaires were retained for the final analysis.

2.3. Sampling technique

A purposive sampling technique was used to select key informants, while stratified random sampling was applied to select residents, ensuring representation from different communities around the park. The sampling also considered gender, occupation, and level of involvement in ecotourism-related activities.

2.4. Data analysis

The data were analyzed using descriptive statistics such as frequencies and percentages with the aid of SPSS version 20 (SPSS, 2011). Descriptive statistical statistics, including frequency distributions, percentages, tables, graphs and narrative summaries to allow for triangulation of both data types were employed to effectively summarize and present the findings. Responses from five Likert scale questionnaires were also analyzed by mean score values, showing the percentage distribution of respondents' answers to illustrate their attitudes and perceptions clearly.

3. Results and Discussion

3.1. Demographic characteristics of respondents

Out of the 128 respondents, 86% were males and 14% females (Figure. 2), indicating a significant gender imbalance and low participation of women in ecotourism-related roles within the local community. This disparity may suggest potential cultural, social, or economic barriers limiting female involvement in the sector. The majority of respondents were engaged in traditional livelihoods such as crop production, livestock rearing, and trade, with ecotourism identified as the second major source of income.

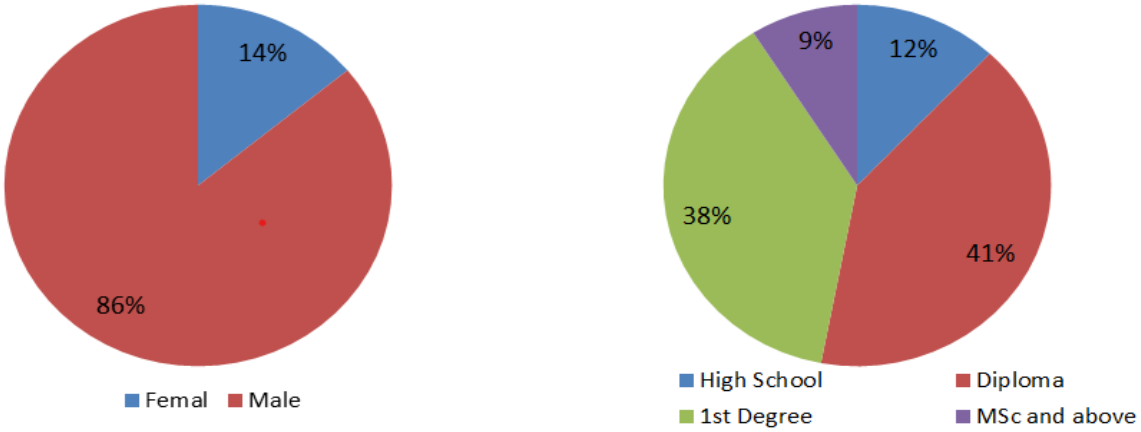


Figure 2: Sex (left) and educational background (right) of the respondent households

The educational background of the respondents varied, with 41% holding diploma, 38% first degree, 12% high school certificate, and 9% possessing a master's degree or higher (Figure 2). This distribution reflects a relatively well-educated group, which may contribute positively to their understanding and participation in ecotourism activities and related services. In terms of work experience, the majority of respondents (56%) reported having more than 13 years of experience in the tourism industry (Fig. 3). This extensive experience suggests that many service providers possess deep knowledge and practical skills relevant to the ecotourism sector, which could enhance the quality of services offered and contribute to sustainable management practices. Overall, the demographic profiles of the respondents indicate a workforce with considerable education and experience but highlight the need to promote greater gender inclusivity within the ecotourism industry in the SMNP.

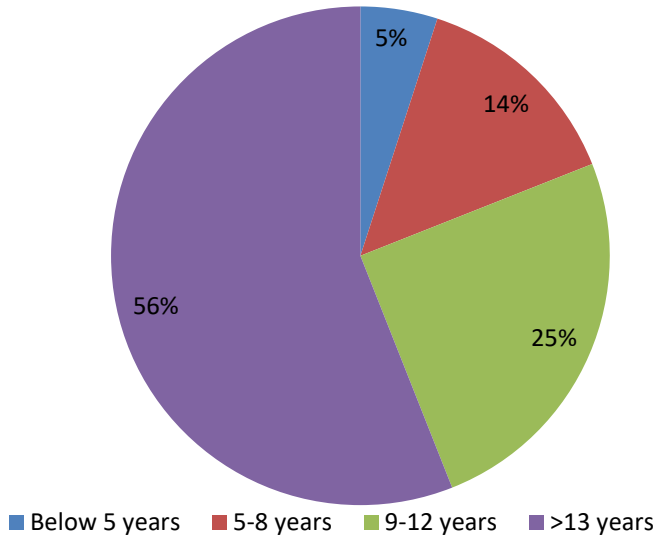


Figure 3: Work experiences of the respondent households

3.2. Established ecotourism associations and local beneficiaries

An important indicator of the ecotourism potential of SMNP is the capacity to engage local communities as direct beneficiaries of tourism-related activities. Currently, around seven cooperatives have been officially established, each responsible for various ecotourism services. These cooperatives were initially formed by large groups of local households, reflecting community-based approaches to tourism management.

Table 1: Ecotourism cooperatives/associations and number of beneficiaries

Name of cooperatives/ Associations	Number of beneficiaries
Mule/horse rental cooperative	6000
Senior local Guide Association	89
Assistant Guide	20
Cook Association	73
Equipment Rental Association	11
Car Rental Association	10
Tourism police association	800
Total number of beneficiaries	7003

Source: Simien Mountains National Park Office, (2017)

Among these cooperatives, the mule and horse rental cooperative and the local tourism police association consist of approximately 6,000 and 800 members respectively (Table 1). These associations provide critical services such as transportation and security, which are essential for visitor experience and safety in the rugged terrain of SMNP and they are also underscoring their prominent role in the local ecotourism economy. Other cooperatives include those focused on guiding, food preparation, and equipment rental, each comprising a significant portion of the local population involved in ecotourism. The active engagement of local cooperatives not only generates income but also fosters collective ownership and stewardship of natural resources, key conditions for sustainable tourism development (Manyara and Jones, 2007; Mbaiwa, 2008; Tessema and Kassa, 2012). This model is in agreement with community-based ecotourism principles emphasizing local participation, equitable benefit-sharing, and community empowerment (Scheyvens, 1999; Simpson, 2008; Tosun, 2000).

In line with this, Mulugeta (2015) reported that communities in and around the SMNP derive tangible economic and social benefits from tourism activities due to their active engagement, underscoring ecotourism's potential as a sustainable livelihood strategy (Honey, 2008; Salazar, 2012). Similarly, Alemu and Ambelu (2013) demonstrated that community participation enhances conservation outcomes by diversifying income sources and reducing dependence on resource extraction (Ashley, 2000; Stronza and Gordillo, 2008). Overall, the cooperative approach offers a viable framework for inclusive ecotourism development, advancing both local livelihoods and conservation objectives. As shown in the Table 1, communities in the SMNP benefit from ecotourism through diverse roles such as guides, cooks, mule and horse renters, vehicle operators, equipment suppliers, and tourism police that illustrated its value as a sustainable livelihood option in protected area contexts (Manyara and Jones, 2007; Tessema *et al*., 2010; Koki *et al*., 2021).

3.3. Potential attractions and resources

3.3.1. Respondents response based on weighted mean, SE and confidence interval

Responses of respondents, weighted mean, SE and confidence interval (CI) for potential tourism attractions and resources are summarized in Table 2. The weighted mean analysis revealed clear differences in how respondents rated for each category/statement asked. Regarding unique landscapes, the respondents expressed the strongest agreement (Mean = 4.42), significantly higher than the other three categories, with a narrow CI (4.25–4.59) (Table 2), indicating a high level of precision and strong consensus among respondents. Moreover, regarding the unique wildlife statement, also expressed a relatively high level of agreement (Mean = 3.91), with its CI entirely above the neutral midpoint (CI: 3.71–4.11), suggesting consistent positive perceptions for the category asked.

Table 2: Descriptive summary of weighted means, standard errors, and 95% confidence intervals

Potential tourism attractions and resources	Weighted Mean	Standard errors (SE)	95% confidence intervals (CI)
Local indigenous culture	**3.63**	0.110	**3.41 – 3.85**
Unique wildlife	**3.91**	0.102	**3.71 – 4.11**
Community handcraft and geo-tourism potential	**3.45**	0.107	**3.24 – 3.66**
Unique landscapes	**4.42**	0.088	**4.25 – 4.59**

In the case of local indigenous culture, they demonstrated moderate agreement (Mean = 3.63). Its confidence interval (3.41–3.85) overlaps the upper neutral region, indicating moderate but less intense agreement compared to the statements of the unique wildlife and unique landscapes category. On the other hand, community handcraft and geo-tourism potential weighted mean value was the lowest (3.45) and the broadest CI relative to its value (3.24–3.66) indicated greater response variability and more mixed perceptions among participants for this category. Overall, the CIs do not overlap substantially between the unique landscape and the others, indicating statistically stronger agreement to unique landscape. The other three categories (1-3 columns) cluster more closely together, suggesting moderately positive but less decisive perceptions.

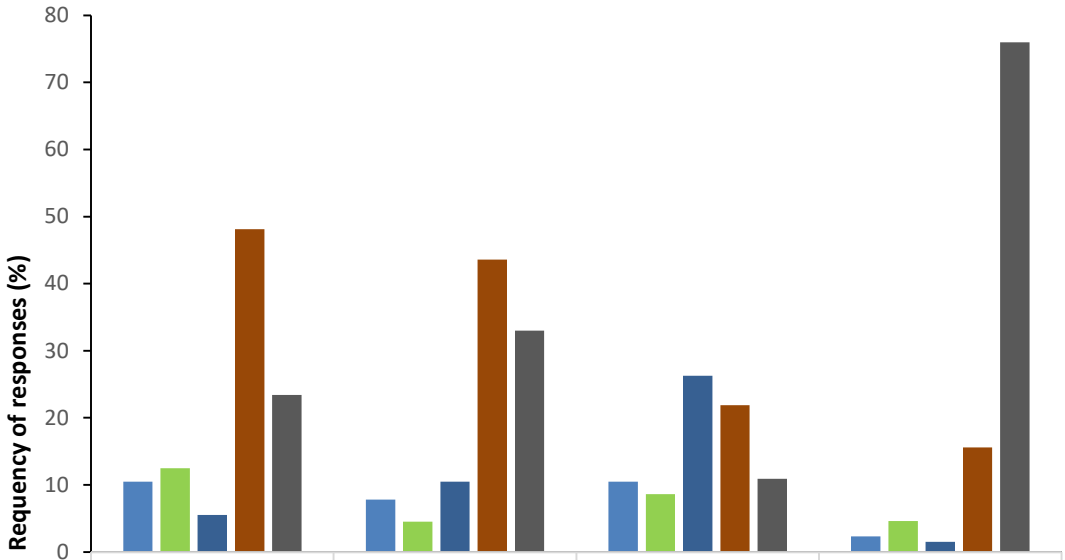
3.3.2. Percentage distribution of respondents' responses

The majority of respondents recognize several key attractions and resources in SMNP as significant potential for ecotourism development. Specifically, 71.5% of respondents agreed and strongly agreed that the local indigenous culture represents a valuable tourism attraction. Similarly, 76.6% of respondents acknowledged the uniqueness of the park's wildlife, including its diverse plant and animal species, as a major ecotourism asset (Fig. 4)

Regarding handicrafts and geotourism potentials, the perception of respondents was somewhat low, with only 32.77% recognizing these attractions. However, the park's unique landscapes received overwhelming support, with 91.6% of respondents agreeing or strongly agreeing that the scenic and geological features constitute one of the most significant tourism resources potentials. Only a small proportion, 1.5% was neutral and 6.9% disagreed with this view.

The recognition of geotourism potential is further supported by key informant interviews with local residents, who emphasized the value of village landscapes and geological features as emerging tourism attractions. This finding aligns with the Japan International Cooperation Agency (JICA, 2013) report, which highlighted the importance of local culture and the unique geomorphology of the Simien Mountains as central to the area's sustainable tourism development strategy.

These findings underscore the diversity of natural and cultural assets in SMNP, confirming previous studies that advocate for integrated ecotourism approaches combining biodiversity conservation with cultural heritage and geotourism (Kebede *et al.*, 2014; Mulugeta, 2015). Leveraging these assets can enhance tourism appeal, foster community engagement, and promote conservation goals.



	Local Indigenous culture	Unique wildlife	community handcraft and geotourism potential	unique landscapes
Strongly disagree	10.5	7.8	10.5	2.3
Disagree	12.5	4.5	8.6	4.6
Neutral	5.5	10.5	26.25	1.5
Agree	48.1	43.6	21.87	15.6
Strongly agree	23.4	33	10.9	76

Figure 4: Percentage distribution of the respondents' response

3.4. Ecotourism market segmentations

Tourism activities at SMNP began shortly after its establishment as a protected area, and visitor numbers have steadily increased over the years. Data on tourist arrivals over three consecutive years (2010, 2011, and 2012), based on the 2013 annual visitor report of SMNP, categorizes visitors by their country of origin. The mean average number of UK visitors ranked the highest, with 1,509 tourists, accounting for 14.1% of the total. This was followed by Germany with 1,220 visitors (11.4%) and France with 1,083 (10.4%). In contrast, Greece and Portugal recorded the lowest average mean arrivals, each contributing just 0.3%. The secondary data on visitor nationalities obtained from the Japan International Cooperation Agency (JICA) (Fig. 5) provides valuable insights into the park's international tourist profile. By identifying the dominant source markets, SMNP can better tailor its marketing strategies, outreach efforts, and service offerings to align with the preferences and expectations of its key visitor groups. This category not only enhances tourist satisfaction but also improves the park's competitiveness in the global ecotourism market. Moreover, nationality-based marketing supports sustainable tourism growth by attracting visitors whose interests align with the park's conservation objectives and community development goals.

Understanding this visitor profile is essential for park managers and tourism planners, including policy makers to effectively target and promote the destination to key markets. The analysis of this secondary data confirms that ecotourism plays an increasingly significant role in local development around the park. The rise in visitor numbers and associated revenue aligns with national tourism growth patterns reported in Ethiopia, as noted by Teshome (2018), and is consistent with similar trends observed in other protected areas across the country (Dase *et al*, 2020; Selassie and Schütt, 2021). Market segmentation by tourists' country of origin is a practical and widely used approach in tourism management. It helps to identify distinct visitor

groups and tailor marketing strategies to their specific needs (Klemm, 2002; Dolnicar, 2004; Middleton and Clarke, 2012). Tourists can be classified as cultural, ecological, or high-spending visitors, allowing efficient resource allocation and improved satisfaction. Studies indicated to use multiple segmentation bases to enhance market targeting (Dolnicar, 2008; Katsoni and Giaoutzi, 2013).

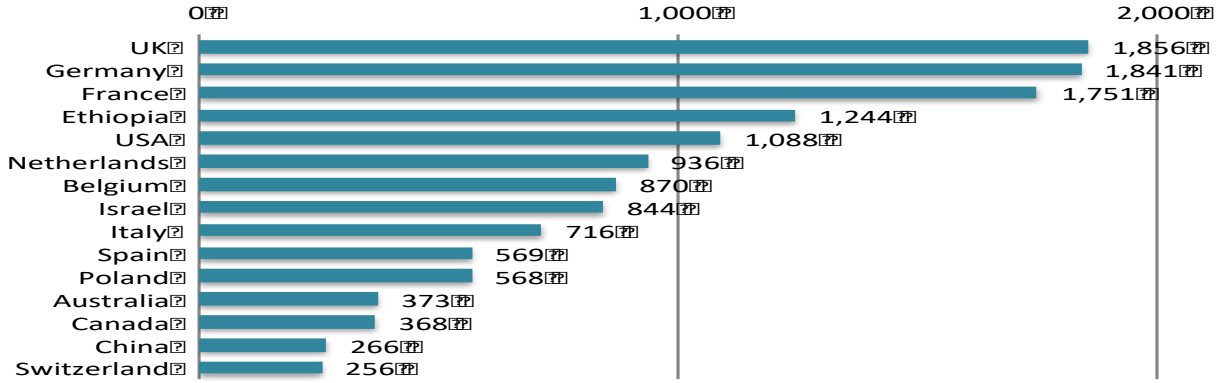


Figure 5: Number of visitors of the Simien Mountains National Park in the year 2014 (Source: JICA, Simien Mountains National Park)

Geographical segmentation, particularly by nationality, is among the earliest and most effective methods in tourism marketing (Haley, 1968; Bowen, 1998; Tkaczynski and Rundle-Thiele, 2011). Visitors from different countries often show unique travel behaviours, cultural expectations, and spending patterns (Kaye *et al*., 2007; Thrane and Farstad, 2012). By examining tourist flows based on nationality, the park can gain a clearer understanding of where most of its visitors originate. Identifying these primary source markets enables the park to design targeted promotional campaigns that appeal to the interests and expectations of these groups. It also allows managers to improve tourism services—such as accommodation, guiding, and information materials—so they better meet the cultural and recreational preferences of key nationalities. In turn, offering services that resonate with visitor needs helps enhance satisfaction and can encourage repeat visitation, strengthening long-term tourism revenue and loyalty to the destination. It also supports sustainable tourism by aligning management strategies with visitor characteristics (Crouch *et al*., 2004; Nduna and Van Zyl, 2017; Fu *et al*., 2025). Consequently, the data presented provide a strategic basis for enhancing the ecotourism potential of SMNP.

3.5. Environmental and socioeconomic impacts of ecotourism

3.5.1. Response of respondents based on weighted mean, SE and confidence interval (CI)

Responses of respondents of weighted mean, SE and CI for problems associated to with ecotourism development are summarized in Table 3. Respondents for the category of destruction of natural resources expressed moderate agreement (3.64) that natural resources are being destroyed. The confidence interval (3.43–3.84) showed that the perception is consistently above neutral. Perceptions to of the statement of acculturation & transformation of culture tended toward agreement (3.49) but are closer to neutral than to the statement for the destruction of natural resources. The wider CI (3.26–3.73) suggests more variability, meaning not all respondents feel the same degree of cultural change.

Table 3: Descriptive summary of weighted means, SE, and 95% CI

Problem associated to ecotourism development	Weighted Mean	SE	95% CI
Destruction of Natural Resources	3.64	0.104	3.43 – 3.84
Acculturation & Transformation of Culture	3.49	0.121	3.26 – 3.73
Economic Inflation	2.47	0.061	2.35 – 2.59
Seasonality of a job	3.91	0.102	3.71 – 4.11

Perception to of the category of economic inflation mean was the lowest-rated (2.47) value below the neutral midpoint (Table 3). The CI (2.35–2.59) is tight, indicating high precision. Respondents generally disagree that economic inflation is influenced by the factor being measured. Respondents perceive economic inflation differently from the other variables—likely not strongly affected by the phenomenon being studied. Perceptions to of the statement of seasonality of a job showed the strongest agreement compared to the other categories described. The high weighted mean (3.91) and narrow CI (3.71–4.11) indicated strong and consistent agreement about the impact of seasonality.

3.5.2. Response of respondents based on percentage

Problems associated with ecotourism developments to environmental and socioeconomic impacts perceived as the response of respondents are summarized in Fig. 6. In response to the statement that ecotourism causes "Destruction of natural resources as a major challenge" most perceived disagreed (57.1%), which means that they perceive tourism's environmental impact as low, manageable, or not a major problem. In other words, most respondents do not believe that ecotourism activities are causing significant destruction of natural resources in the area (SMNP). However, Gichiah (2004) reported campsite degradation and damage to unique flora, which is consistent with the observations of Leung *et al.* (2018) and Monz *et al*. (2010) who documented vegetation loss and soil erosion in high-use ecotourism sites. Similarly, Knight and Cole (1995) reported soil compaction, vegetation loss, and trail erosion caused by hikers and pack animals. In addition, Pickering *et al*. (2010) and Marion and Wimpey (2017) highlighted trail widening and habitat disturbance as persistent issues in protected areas. In agreement with this idea, comparable impacts were also identified by Cole (1995 and Deluca *et al*. (1998). Moreover, Newsome *et al*. (2012) and Ballantyne and Pickering (2005) stated that repeated trampling and unmanaged visitation significantly increase soil compaction and reduce plant diversity as a result of tourism.

It is in agreement with the study that found increased visitor activity contributed to environmental degradation (Ndege, 2011; Odede *et al*., 2023), emphasizing the need for stricter visitor. In a similar way minority of the respondents of (30.4%) in our result viewed ecotourism activities as a problem, while 12.5% remained neutral. This divergence of perspectives highlights the importance of ongoing environmental monitoring and impact assessment to ensure that ecotourism remains sustainable. The Economic Commission for Africa (2011) and others (Kimani, 2015; Abate, 2017; Hassen, 2018; Ogweno, 2021) noted that unplanned tourism structures in protected areas exacerbate environmental degradation. Although ecotourism supports conservation and awareness, its sustainability depends on investment in low-impact infrastructure, visitor education, and regular monitoring of tourism pressures such as trail use and waste.

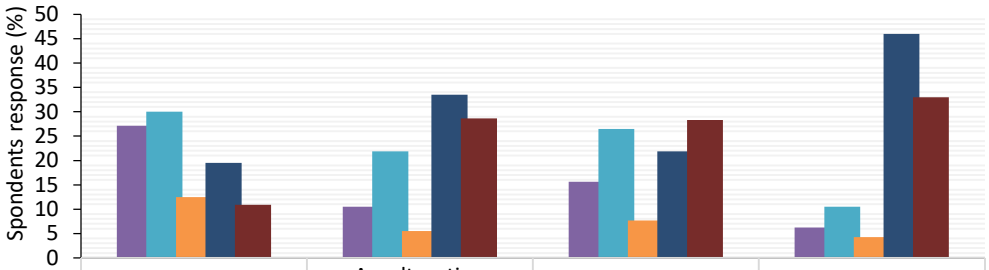
Respondents' views on socio cultural impacts revealed that 62.13 % were agreed and strongly agreed (Fig. 6), perceiving with the statement that acculturation and cultural transformation pose a challenge to the community. As tourism expands, particularly when visitors are primarily from developed nations and host communities are in developing regions, there is a heightened risk of cultural erosion. This finding aligns with longstanding concerns in global ecotourism research, in which exposure to foreign cultures often leads to shifts in local traditions, values and lifestyles, hybridisation and commodification of local culture (Smith, 1989; dos Santos and Carter, 2000; Odede *et al*., 2023).

On the issue of economic inflation, more than half of respondents (50.2%) agreed that prices of goods and

services in the ecotourism destination have increased due to growing tourist demand. This trend aligns with wider research on inflationary pressures in tourism-intensive areas, which demonstrates that heightened visitor demand can raise the cost of basic commodities and services for local residents (The Impact of Economic Inflation on the Quality of Tourism Services, 2025.

Ethiopian context, the expansion of tourism employment particularly among women and youth working in hospitality, guiding, handicrafts, and cultural performances in local towns has become increasingly significant such as Debark—has been identified as a driver of local economic transformation (Ethiopia: On Her Way to Become Africa's Major Tourism Hub, 2025). While these employment gains contribute to poverty reduction and diversification of livelihoods, they also introduce structural shifts that may increase the overall cost of living for host communities.

Regarding employment, more than 3/4th of respondents (79%) agreed and strongly agreed that tourism jobs are largely seasonal, contributing to discontinuous income streams. This finding reflects the broader literature, which consistently identifies seasonality as a persistent challenge in tourism-dependent economies, leading to job insecurity, income instability, and limited opportunities for stable, year-round employment (Baum *et al*., 2023; Grobelna and Skrzeszewska, 2019). Additional studies further emphasize that such seasonal fluctuations can undermine long-term career development and reduce the sector's attractiveness to local workers (Jolliffe and Farnsworth, 2022).



	Destruction of natural resources	Acculturation and transformation of culture	Economic inflation	seasonality of the job
Strongly disagree	27.1	10.5	15.6	6.25
Disagree	30	21.87	26.5	10.5
Neutral	12.5	5.5	7.7	4.25
Agree	19.5	33.5	21.87	46
Strongly agree	10.9	28.63	28.33	33

Figure 6: Distribution of respondents' responses on negative impacts of ecotourism

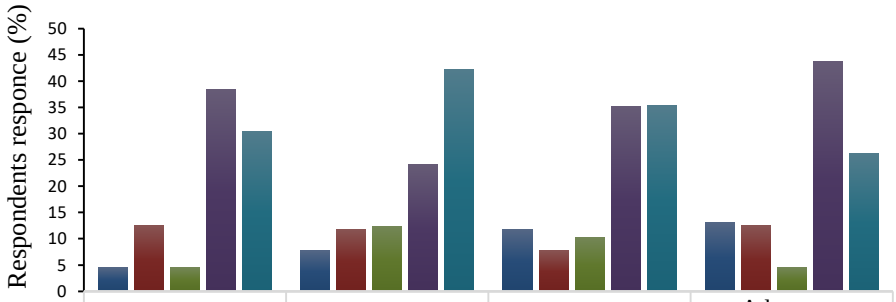
3.5.3. Response of respondents-based percentage

In relation to socio-cultural impacts, 80 respondents (62.13%) agreed and strongly agreed with the statement that acculturation and cultural borrowing/transformation poses a significant challenge. As tourism expands, especially in contexts where visitors are primarily from developed nations and host communities are from developing regions, there is a heightened risk of cultural erosion. This finding aligns with concerns in global ecotourism, where exposure to foreign cultures often leads to shifts in local traditions, values, and lifestyles (Smith, 1989).

On the issue of economic inflation, more than half of respondents (50.2%) agreed that prices of goods and services in the ecotourism destination have increased due to growing tourist demand. This trend aligns with wider research on inflationary pressures in tourism-intensive areas, which demonstrates that heightened visitor demand can raise the cost of basic commodities and services for local residents (The

Impact of Economic Inflation on the Quality of Tourism Services, 2025). In the Ethiopian context, the expansion of tourism employment—particularly among women and youth in hospitality, guiding, handicrafts, and cultural performances in towns such as Debark has been identified as a driver of local economic transformation (Ethiopia: On Her Way to Become Africa's Major Tourism Hub, 2025). While these employment gains contribute to poverty reduction and diversification of livelihoods, they also introduce structural shifts that may increase the overall cost of living for host communities.

Regarding employment, more than 3/4th of respondents (79%) agreed and strongly agreed that tourism jobs are largely seasonal, contributing to discontinuous income streams. This finding mirrors the broader literature, which consistently identifies seasonality as a persistent challenge in tourism-dependent economies, leading to job insecurity, income instability, and limited opportunities for stable, year-round employment (Grobelna and Skrzeszewska, 2019; Baum *et al*., 2023). Additional studies further emphasize that such seasonal fluctuations can undermine long-term career development and reduce the sector's attractiveness to local workers (Jolliffe and Farnsworth, 2022).



	Wild mammals and Birdwatching	Hiking and trekking in the Mountains	village tourism practice and demonstration	Adventure tourism(base-jumping, mountain climbing, paragliding
Strongly disagree	4.5	7.8	11.7	13
Disagree	12.5	11.7	7.8	12.5
Neutral	4.5	12.3	10.15	4.5
Agree	38.3	24.2	35.1	43.75
Strongly Disagree	30.4	42.2	35.25	26.25

Figure 7: Distribution of the responses uf participants on the potential activities and practices of ecotourism

3.6. Types of ecotourism activities and practices

3.6.1. Response of respondents based on weighted mean, SE, and CI

Responses of respondents of weighted mean, SE and CI for the different types of ecotourism activities and practices are summarized in Table 4. Across the four categories asked, respondents consistently perceived positive attitudes, with all weighted means falling between 3.71 and 3.93 on a 5-point Likert scale. This indicated that, overall, participants tended to agree with the statements. When considered together, the combined results showed that respondents generally hold favorable perceptions, with minimal negative sentiment. The 95% CI intervals for all four categories are narrow (approximately ±0.12) (Table 4), suggesting a high level of precision and low variability in the responses. This consistency reinforces to conclude the conclusion that the overall respondent group showed strong, stable, and reliably positive attitudes across all items/categories asked. In

summary, the combined analysis suggests that participants broadly support, agree with, or feel positively toward the subject measured in these four questions, with very few respondents expressing negative views and a strong clustering of responses toward the positive end of the scale.

Table 4: Descriptive summary of weighted mean, SE and CI

Types of ecotourism activities & practices	Weighted Mean	SE	95% CI
Wild mammals and bird watching	3.93	0.058	3.82 – 4.04
Hiking and trekking in the mountains	3.90	0.061	3.78 – 4.02
Village tourism practice and demonstration	3.80	0.069	3.66 – 3.94
Jumping, mountain climbing, paragliding	3.71	0.071	3.57 – 3.85

3.6.2. Response of respondents based on percentage

The response of the respondents in percentage in relation to the type of ecotourism activities and practices in the park are summarized in (Fig. 7) in which generally they expressed positive attitudes. Regarding to wildlife-based tourism, 68.7 % of the respondents agreed and strongly agreed with the statement supporting that wild mammal and bird watching is the activity engaged by many visitors in the park, with only 4.5 % neutral and 17.0 % disagreed and strongly disagreed, which is in agreement with the report of Smith (2020). In a similar way, 66.4 % respondents agreed and strongly agreed that hiking and trekking are the well performed activities most perceived, while 12.3 % were neutral and 19.5 % disagreed and strongly disagreed with the statement, which is consistent with the report of Jones and Bekele (2021).

In relation to village tourism practices and cultural demonstrations that includes traditional activities (like injera baking, local beer brewing, blacksmithing, and hairdressing demonstrations), the majority of the respondents (70.35%) agreed and strongly agreed with the statement, perceiving as it is the well performing activity by which the local community engaged in the park. Meanwhile, 10.15% were neutral on the matter, which it is in agreement to with Abebe and Tesfaye (2022). In the case of generate socio-economic benefits for host communities. Generally, the data on the potentials for ecotourism activities and practices in the park underscores the importance of diversifying tourism offerings to cater to varying preferences ranging from, passive wildlife observation to active adventure adventure tourism, that comprises base jumping, mountain climbing, and paragliding, 70% of respondents supported these activities (agree and strongly agree) as one of the best they enjoyed, showing a favourable attitude, high adrenalin experience in the park. However, 4.5% remaining neutral and 25.5% expressing disagreement and strong disagreement, suggesting a more divided perspective, likely influenced by concerns related to safety, experience level, or risk tolerance, which is consistent with the report of Desta (2023).

These findings highlight a generally positive attitude towards ecotourism and adventure-based tourism products, with cultural and wildlife experiences receiving particularly strong support among respondents. Additional studies support these trends, demonstrating that wildlife viewing and nature-based activities consistently attract high visitor satisfaction and perceived value (Kahangwa, 2018) and that cultural heritage tourism in rural settings can enhance local engagement and support when designed well (Novo, 2021). The strong interest in village tourism practices aligns with broader trends in sustainable and community-based tourism, where travellers increasingly seek authentic, hands-on interactions with host communities (Scheyvens, 2002; Reimer and Walter, 2013; UNWTO, 2020). These types of experiences not only enhance visitor satisfaction but also support the preservation of local culture and sports and immersive cultural encounters. Policymakers and tourism planners should consider these preferences when designing tourism products that are sustainable, inclusive, and aligned with both local capacity and visitor demand.

3.7. Major sources of income for local communities

The results of the survey on the main sources of income for local communities are summarized in Table 5. An index-based analysis was used to rank the diversification of livelihoods and income sources among local communities according to their relative importance. Among the various sources identified, crop production had the highest index value (0.30), highlighting its continued dominance as the main source of income for most households in the study area.

Table 5: Descriptive summary of source of income for local community

Main sources of income	1st	2nd	3rd	4th	Index	Rank
Crop production	41.9	29.6	27.8	0.6	0.30	1
Livestock production	38.3	29.9	12.6	0.0	0.24	3
Trade	4.8	6.0	22.5	31.4	0.19	4
Ecotourism	15.0	30.8	29.3	14.7	0.27	2

Source: Author's own computation using the index formula

Despite the dominance of agriculture, the data also reveal that ecotourism plays a significant and growing role in supporting local livelihoods. Its contribution, though not the highest by index value, is substantial enough to influence daily economic activities and improve household incomes.

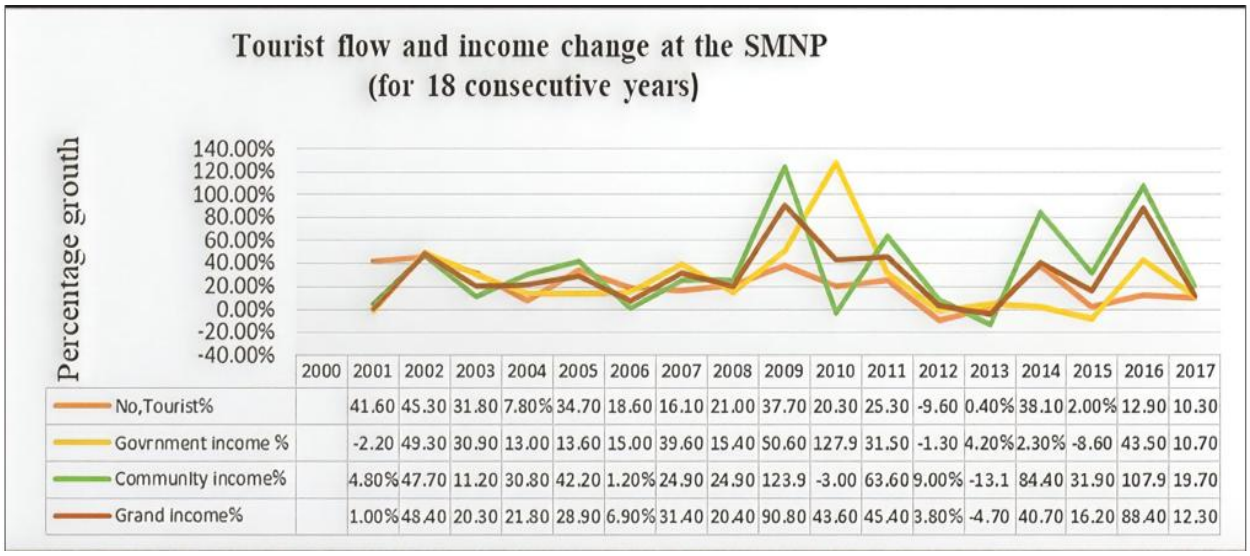
The importance of ecotourism is further underscored by its integration into other livelihood strategies, such as employment in guiding services, accommodation provision, handicrafts, and pack animal rentals. Following crop production, livestock rearing was identified and ranking the third most important income source.

This diversification reflects the adaptive strategies of rural households seeking to balance subsistence needs with emerging income opportunities, particularly those linked to ecotourism development. These findings are consistent with Ashley (2000) and Salafsky *et al.* (2001) who demonstrated that while traditional agriculture remains vital, alternative income sources like ecotourism can enhance rural livelihoods, reduce dependency on natural resource extraction, and promote sustainable development.

3.8. Tourist population and revenue generation

Number of visitors and revenue generation for 18 years in SMNP is presented in and showed steadily increase between 2000 and 2017, underscoring the growing economic value of the park. This pattern reflects global evidence that well-managed ecotourism can advance both conservation and community development (Honey, 2008; Buckley, 2009; UNEP, 2011; UNWTO, 2013) (Fig. 9). Simein Mountains National Park's designation as a UNESCO World Heritage Site, combined with its exceptional biodiversity and ongoing infrastructure improvements, has significantly increased its attractiveness for nature-based tourism.

Rising accessibility and service quality align with research showing that better facilities and marketing directly boost visitation (Eagles *et al*., 2002; Ritchie and Crouch, 2003; WTO, 2010; Weaver, 2011).



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017
No,Tourist%		41.60	45.30	31.80	7.80%	34.70	18.60	16.10	21.00	37.70	20.30	25.30	-9.60	0.40%	38.10	2.00%	12.90	10.30
Govrnment income %		-2.20	49.30	30.90	13.00	13.60	15.00	39.60	15.40	50.60	127.9	31.50	-1.30	4.20%	2.30%	-8.60	43.50	10.70
Community income%		4.80%	47.70	11.20	30.80	42.20	1.20%	24.90	24.90	123.9	-3.00	63.60	9.00%	-13.1	84.40	31.90	107.9	19.70
Grand Income%		1.00%	48.40	20.30	21.80	28.90	6.90%	31.40	20.40	90.80	43.60	45.40	3.80%	-4.70	40.70	16.20	88.40	12.30

Figure 9: Number of visitors and revenue generated for 18 years

The tourism revenue in 2018 was estimated over 28.9 million ETB (approximately 1.02 million USD with the exchange rate of 28.45) supports conservation financing and local livelihoods. This mirrors findings that tourism income can fund park management while diversifying community livelihoods when benefits are shared equitably (Ashley *et al*., 2001; Emerton *et al*., 2006; Scheyvens, 2007; Spenceley and Snyman, 2017).

The benefits of growth gained from ecotourism activities had have gone through several challenges. The data also suggest fluctuations in annual revenue and visitor flow, often influenced by broader factors such as regional political stability, global economic conditions, marketing reach, and climatic variability. For instance, seasonal inaccessibility due to heavy rainfall (July–September) can limit tourist activities, highlighting the park's vulnerability to climate and the need for adaptive management strategies (Tsegaye *et al*., 2014). Increasing visitation also brings the risk of environmental degradation, particularly if tourism grows beyond the park's carrying capacity or if sustainable practices are not strictly implemented. Research shows that unregulated tourism can damage fragile mountain ecosystems and disrupt wildlife habitats (Nepal, 2000; Buckley, 2004; Pickering and Barros, 2015). Therefore, SMNP must carefully balance economic gains with the protection of its ecological integrity to ensure long-term sustainability (Eagles *et al*., 2002; Weaver, 2011).

Sustaining this growth requires a participatory management approach that engages local communities, park authorities, and tour operators. Strengthening community-based ecotourism models helps ensure that tourism benefits reach marginalized groups, thereby increasing local support for conservation (Scheyvens, 1999; Tosun, 2000; Goodwin and Roe, 2001). Additionally, reinvesting tourism revenue into conservation, education, and community development enhances both ecological integrity and long-term economic resilience (Eagles *et al*., 2002; Emerton *et al*., 2006; Spenceley, 2008).

3.9. Local community perspectives on the impacts of ecotourism development

During the field research, interviews were conducted with local residents living in and around the SMNP. The responses indicate a generally positive perception of ecotourism and its associated developments in the region. A majority of respondents (75%) reported that ecotourism has played a role in enhancing local infrastructure and public services. Notable developments mentioned include the construction or improvement of schools, health care facilities, water supply systems, and other essential infrastructure. Respondents attributed these improvements to increased government and stakeholder attention driven by the economic

potential of ecotourism in the area. The findings from local community interviews underscore the critical role ecotourism plays in driving sustainable development in SMNP. The reported improvements in infrastructure and basic services align with broader global evidence suggesting that nature-based tourism can stimulate rural development, especially in remote and ecologically sensitive regions (Ashley and Roe, 2002; Spenceley, 2008). The majority consensus among respondents about improved social services supports the claim that ecotourism has contributed positively to the community's quality of life. Similar observations have been made in other protected areas in Africa, where tourism income has been used to fund community infrastructure and education initiatives (Snyman, 2014).

Furthermore, 89% of participants indicated that there is a functional and collaborative management system in place between the local community and governmental bodies. This collaboration is particularly evident in activities such as environmental rehabilitation, afforestation, and the conservation of natural and cultural resources. Community members also participate in promoting the park as a tourism destination, which enhances conservation awareness and reinforces the value of natural heritage. Equally important is the integration of local communities into park management and conservation efforts.

The reported participation in afforestation and conservation projects indicates a growing sense of ownership and environmental stewardship among residents. According to Pretty and Smith (2004), community participation in natural resource management is a key factor in the success of conservation-based development programs. It is not only enhancing ecological outcomes but also builds long-term local support for protected area governance.

In addition, 90% of respondents replied that households, especially those residing adjacent to the park boundaries, directly benefit from tourism-related activities. These benefits include employment opportunities as guides and porters, income from homestays and handicrafts, and access to community-based tourism projects. The benefits mentioned by 90% of respondents—mainly accruing to households near the park—also point to the importance of proximity in accessing tourism-derived benefits. While this shows that ecotourism can have direct and tangible local economic impacts, it also raises concerns about equitable benefit-sharing among broader community members. Research suggests that unless benefits are distributed fairly, tourism development may lead to localized disparities and tensions (Scheyvens, 1999).

The positive attitudes of residents toward ecotourism in SMNP indicated that there was strong community support, which was crucial for the park's long-term sustainability. However, to maintain this momentum, stakeholders must continue to engage communities in participatory planning, ensure inclusive benefit-sharing, and provide training that enables locals to participate in higher-value segments of the tourism value chain.

3.10. Visitors' perspectives on ecotourism development

As part of this study, visitors to SMNP were interviewed using both open-ended and close-ended questions to assess their perceptions of ecotourism in the destination. The results reflect a mix of appreciation and concern regarding the park's services, infrastructure, and the impact of tourism on local communities (Taizeng *et al*., 2019). The visitors' responses provide a critical external perspective on both the strengths and challenges of ecotourism in SMNP. While tourism has introduced important socio-economic benefits, such as employment generation and cultural exchange, the findings suggest that these gains are being undermined by weak infrastructure, environmental concerns, and socio-economic side effects.

There are a number of respondents who expressed dissatisfaction with the quality and availability of infrastructure and tourism services. Many noted that facilities such as accommodations, roads, rest stops, and signage are either underdeveloped or entirely lacking in certain areas. According to several visitors, the negatively perceived issue not only diminishes the overall tourism experience but also risks harming the natural environment and local communities by contributing to pollution and resource degradation.

Infrastructural limitations, as reported by visitors, reflect a common barrier in the development of sustainable tourism in many protected areas in Sub-Saharan Africa. According to Eagles *et al.* (2002), inadequate infrastructure not only reduces visitor satisfaction but can also limit a destination's carrying capacity and lead to environmental degradation. In SMNP, the lack of proper waste management systems and regulated access to sensitive areas may contribute to pollution and the disruption of natural habitats, as indicated by several interviewees.

Furthermore, visitors noted an increase in the prices of local products—such as food and basic supplies—during the tourism season. This price inflation affects both tourists and residents, potentially leading to a higher cost of living for local communities. These observations align with broader critiques of tourism in developing regions, where demand from international visitors can distort local markets (Mbaiwa, 2005). The reported inflation in the price of local goods echoes concerns about "tourism-induced inflation," where the influx of tourists and increased demand for basic commodities results in rising prices that disproportionately affect low-income residents (Liu *et al*., 2020). This highlights a need for local authorities to monitor and manage the economic impacts of tourism more carefully, ensuring that benefits outweigh the costs for host communities.

On a more positive note, 80% of the visitors interviewed and reported that satisfaction with specific tourism services, particularly the quality of local guides and the availability of village-based tourism experiences. These offerings were praised for providing authentic cultural interaction and supporting community livelihoods.

The majority of visitors acknowledged that the outcomes of ecotourism activities have generating job opportunities for communities in the area. However, about 15% of respondents felt that these employment opportunities remain limited in scope and do not reach a broad segment of the population. Positive assessments of guide services and community-based tourism experiences suggest that, despite challenges, SMNP has successfully implemented some aspects of ecotourism best practices. The provision of trained local guides and cultural tourism activities creates both employment and incentives for conservation. As Scheyvens (1999) argues that, local involvement in tourism is crucial for ensuring both the sustainability of the industry and the empowerment of host communities.

However, concerns about the limited reach of job opportunities raised by 15% of visitors—suggest that more inclusive employment strategies are needed. This may involve expanding training programs, supporting women and youth participation, and diversifying tourism offerings to extend benefits to more households. Long-term success will depend on improving access to these opportunities while ensuring the protection of the park's ecological and cultural assets.

4. Conclusion

This study underscores the critical role of ecotourism in advancing sustainable development and biodiversity conservation in SMNP, Ethiopia. The findings reveal that ecotourism serves as a significant supplementary livelihood for local communities, with over 7,000 individuals directly benefiting from tourism-related activities. The steady growth in visitor numbers and associated revenue between 2000 and 2017 reflects the increasing economic potential of ecotourism in the region. Despite its promise, the development of ecotourism in Simien Mountains National Park faces several problems. These include institutional weaknesses, limited diversification of tourism activities, inadequate service quality, and socio-economic issues such as seasonality, inflation, and cultural impacts. These constraints hinder the full realization of ecotourism's benefits and emphasize the need for targeted policy interventions. The study highlights that ecotourism can contribute to conservation and community development; its long-term sustainability depends on inclusive planning, policy support, and coordinated stakeholder engagement.

Acknowledgement

We gratefully acknowledge Bahir Dar University, Bahir Dar, Ethiopia for the arrangement of the required logistics during the field work.

Conflict of interest

The author declared no conflict of interest associated with this work.

Data availability statement

Data will be made available upon request.

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