



# Economic impact of hiking tourism on the Selo route in Mount Merbabu National Park: An estimation of the multiplier effect analysis

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## ABSTRACT

**Background:** Mount Merbabu is one of the famous natural tourist attractions in Central Java, and it is known for its stunning natural panorama. Climbers who explore Mount Merbabu can enjoy spectacular views of the sunrise, the sea of clouds, and the rows of mountain peaks around it. Tourism activities along the Selo Hiking Trail impact the local community's social and economic aspects, both directly and indirectly. This study aims to identify the social impacts and estimate the economic impact of tourism on the community along the Selo Hiking Trail. **Methods:** This study uses the Multiplier Effect analysis method to evaluate the economic impact of tourism activities. This method involves measuring several economic indicators, including the Keynesian Income Multiplier, Type I Ratio Income Multiplier, and Type II Ratio Income Multiplier, to determine the effect of tourism activities on the local economy. **Findings:** The study results indicate that tourism activities along the Selo Hiking Trail have a significant economic impact. The Keynesian Income Multiplier value reaches 0.6, the Type I Ratio Income Multiplier is 3.3, and the Type II Ratio Income Multiplier is 3.5. This indicates that tourism activities positively affect the income of the surrounding community and encourage local economic growth. **Conclusion:** From the analysis results, it can be concluded that tourism on the Selo Hiking Trail has a positive economic impact through the multiplier effect. However, further research is needed to focus on culture-based tourism or Community-Based Tourism in the surrounding villages to increase the economic benefits for the surrounding community. **Novelty/Originality of this article:** This study introduces the Multiplier Effect analysis approach in evaluating the economic impact of tourism on Mount Merbabu, providing new insights into the economic contribution of tourism to local communities. These findings also highlight the importance of developing culture-based tourism to expand local communities' economic and social benefits.

**KEYWORDS:** economic impact, mountain climbing, multiplier effect

## 1. Introduction

The Selo Climbing Route analysis is one of the official routes for climbing Mount Merbabu. Administratively, this route is located in Dukuh Genting, Tarubatang Village, Selo District, Boyolali Regency. Historically, the climbing of Mount Merbabu via the Selo Climbing

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Route began in 1967. However, between 1963 and 1974, the forest area of Mount Merbabu was managed by the State Forestry Company in accordance with Government Regulation Number 35 of 1963 (BTNGMb 2010), and from 1974 to 2004, its management was taken over by Perum Perhutani, KPH Surakarta, and KPH Magelang based on Government Regulation Number 15 of 1972 or the Minister of Agriculture's Decree Number 76/KPTS/UM/2/1974 (RPKH KPH Magelang 1987; RPKH KPH Surakarta 2007). The management of the area was generally not focused on nature tourism, but rather on forest plant production.

In 2004, the Minister of Forestry issued Ministerial Decree Number 135/Menhut-II/2004, changing the function of approximately  $\pm$  5,725 hectares of the Protected Forest and Nature Tourism Park in the Gunung Merbabu Forest Group into the Gunung Merbabu National Park. This designation was based on the importance of the area as a water source for the surrounding communities, the presence of protected flora and fauna, and its potential as a natural tourism destination (BTNGMb 2014). Since the decree, the Selo Climbing Route has been officially managed by Mount Merbabu National Park under the supervision of the Selo Resort, which was established in 2007 in Tarubatang Village, Selo Subdistrict, Boyolali Regency.

Tourism activities on the Selo Climbing Route generally include mountain climbing and camping in the utilization and wilderness zones of the Mount Merbabu National Park area. The wilderness zone in Mount Merbabu National Park, used as the Selo climbing route, stretches from the south to the north, bisecting the core zone. According to Satyatama (2008), the Selo Climbing Route is the most favored route due to its easy access, beautiful scenery, and comfortable, easy-to-traverse path. Tourists visiting the Selo Climbing Route Tourist Attraction are required to obtain a Conservation Area Entry Permit (SIMAKSI) for IDR 20,000 per person. If tourists use private vehicles, a parking fee of IDR 10,000 for motorcycles and IDR 20,000 for cars will be charged. Hiking tourists in Merbabu are predominantly students aged 15-24. Tourists in Merbabu come from various regions, but most are from Central Java and Yogyakarta (Purtanto et al. 2020). According to statistics from the Mount Merbabu National Park Office, the total number of hiking tourists on the Selo Route in 2014 was 10,000, which increased exponentially to 80,000 in 2018 (BTNGMb 2018). Cohen's theory (1984) states that tourism impacts the interconnectedness and involvement between local communities and the wider society.

There are several base camps in the form of residents' houses that can be used for resting before or after the climb. Generally, there is no charge for staying at the base camps since not many facilities are provided. Tourists who want to charge electronic devices, use Wi-Fi, use the bathroom, or request a private room will incur a fee.

The Selo Climbing Route tourist attraction is located in Tarubatang Village, specifically in Genting Hamlet, which directly borders the Selo Climbing Route Entrance of Mount Merbabu National Park. Tarubatang Village is situated at an altitude of 1800 meters above sea level with an area of 380.4 hectares. According to data from the Boyolali Regency BPS (2021), Tarubatang Village has a population of 2,762 people, consisting of 1,398 males and 1,364 females. Administratively, Tarubatang Village borders Senden Village to the north, Selo Village to the south, the Mount Merbabu National Park forest area to the west, and Cepogo Village, Cepogo District, to the east.

The majority of the residents of Tarubatang Village are Muslim. In terms of education, most of the residents in Tarubatang Village are elementary school graduates (Sekolah Dasar). According to data from the Central Statistics Agency (BPS) of Selo District (2021), the number of residents in Selo District with an elementary school education is 13,988, or 46.47%. The social life of the Tarubatang Village community still upholds the philosophical values of Javanese culture, which can be seen from the preservation of local traditions such as the Sadranan ceremony, Merti Dusun, life cycle ceremonies, Sholawatan, Rosulan, and community mutual assistance activities that are still regularly carried out to this day.

The majority of the residents of Tarubatang Village work as farmers. Most of the population in Selo District aged ten years and above have their main occupation as food and non-food crop farmers (BPS Boyolali Regency 2021). The indigenous people of Selo District

possess land passed down through generations, used for both agriculture and residence. The location of Tarubatang Village, bordering the Selo Climbing Route tourist attraction, provides an opportunity for villagers to start businesses related to tourism activities, either as their main job or as a side job. Besides the residents of Tarubatang Village, many people from Senden Village and Selo Village are currently contributing to tourism in the Selo Climbing Route area as volunteers or workers. Therefore, the communities around the area referred to in this study include the residents of Tarubatang Village, Senden Village, and Selo Village.

According to Ismail et al. (2017), tourism activities have both direct impacts, such as job creation, and indirect impacts, such as business opportunities in the sale of goods and services. This is influenced, as mentioned by Thelisa et al. (2018), by the increased awareness among the community about the importance of skills in serving tourists. Martono (2014) noted that the level of community development can be reflected in the high motivation to grow and achieve within the community itself. Hermawan (2016) argued that tourism development can create new opportunities in the form of jobs and businesses in the tourism sector that were previously unavailable. Hijriati (2013) added that the development of ecotourism can enhance the intensity of interactions among community members and promote cooperation in tourism management, often involving cultural exchanges between local communities and tourists (Tafalas, 2010). Faizun (2009) demonstrated that tourism development has both positive and negative impacts on the community and the region, as also acknowledged by Yulia (2017), who noted that the development of tourist sites can bring negative impacts to the community.

In this context, the analysis of the economic impact of tourism activities on the Selo Climbing Route of Mount Merbabu National Park is crucial for making policies that are economically beneficial for the local economy, while minimizing negative impacts such as criminal activities that can affect the image of the tourist attraction (Sari & Mahagangga, 2014). Therefore, a comprehensive understanding of the economic impact of tourism activities in the area is necessary to optimize economic benefits for the local community and manage potential risks.

This research attempts to analyze the positive and negative impacts of mountain climbing tourism activities along the Selo Route from social and economic variables. The stages of this research include estimating the economic impact using the Multiplier Effect Analysis approach to assess the economic benefits. Tourism activities along the Selo Route have economic impacts such as income generation for the community through business unit revenues, rental of goods and services, employment opportunities, and increased local revenue. Economic changes also influence social life in the community, potentially leading to social disputes due to existing social inequalities, cultural shifts, and changes in communal lifestyles. This research aims to provide insights into the social and economic impacts on local communities resulting from tourism activities along the Selo Climbing Route in Mount Merbabu National Park. These findings are intended to support the evaluation of area management and the formulation of improved policy alternatives.

## 2. Methods

This research was conducted around the tourist attraction of the Selo Climbing Route in Mount Merbabu National Park, specifically in three villages (Tarubatang Village, Selo Village, and Senden Village), Selo District, Boyolali Regency, Central Java. The tools utilized in this research include stationery, digital cameras, recording devices, and maps related to the tourist attractions along the Selo Climbing Route in Mount Merbabu National Park. The instrument employed specifically is the interview questionnaire.

### 2.1 Types and methods of data collection

The data used in this study consists of primary data obtained through interviews.

Economic variables include direct, indirect, and related influences. Interviews were conducted using two methods: face-to-face (offline) and online (via Google Form distributed through WhatsApp). Face-to-face interviews were conducted directly with respondents, while online interviews used questionnaires.

Interviews to gather economic variable data were conducted with tourists and business owners. Respondents, including tourists, business owners, and workers, were selected using purposive sampling. Tourist respondents were selected both directly and indirectly (online). The selection criteria included individuals who have recently or previously hiked Mount Merbabu via the Selo route within the last five years and were willing to participate in the interviews. In cases involving group respondents, only one member was interviewed based on recommendations from Selo Resort management, the owner of basecamps and restaurants in Selo, and the Mountaineering Group organization. The determination of the number of tourist respondents for this study was calculated using the Slovin formula (Prasetyo and Lina 2007).

The percentage of tourists interviewed using E was 10 percent, totaling 100 tourists out of the total 80,648 visitors on the Selo Climbing Route in 2018 (BTNGMb 2018). Interviews with tourists were conducted using a questionnaire comprising multiple-choice and open-ended questions. Selection of business owner respondents was based on representation from various types of businesses around the tourism site such as eateries, rental of climbing equipment, guide services, souvenir shops, transportation services, basecamp management, and parking services. The number of business owner and employee respondents was based on a minimum acceptable sample size, with 30 samples taken from each group. A sample size of 30 respondents was considered sufficient to represent a population whose total number is unknown (Koentjaraningrat 1993).

## 2.2 Method of data analysis

The Multiplier Effect analysis is used to assess the economic impacts of climbing tourism along the Selo route in Mount Merbabu National Park. This analysis encompasses tourists, business owners, and laborers along the Selo climbing route. The economic impact on local communities can be measured using two types of multipliers, namely the Keynesian Income Multiplier, and the Ratio Income Multiplier.

Keynesian Income Multiplier, Ratio Income Multiplier Type I, and Ratio Income Multiplier Type II have specific criteria: If the value is less than or equal to zero ( $\leq 0$ ), then the tourism site has not yet generated economic impacts on the community; If the value is between zero and one ( $0 < x < 1$ ), then the tourism site has a low economic impact on the community; If the value is greater than or equal to one ( $\geq 1$ ), then the tourism site has successfully generated economic impacts for the community.

## 3. Results and Discussion

### 3.1. History and management of the Selo hiking trail

Analysis of the Selo Climbing Route is one of the official routes that can be used to climb Mount Merbabu. Administratively, the Selo Climbing Route is located in Dukuh Genting, Tarubatang Village, Selo District, Boyolali Regency. Based on historical records, climbing Mount Merbabu via the Selo Climbing Route has begun since 1967. However, in the period (1963-1974) the management of the Mount Merbabu forest area was managed by the State Company Perhutani based on Government Regulation Number 35 of 1963 (BTNGMb 2010), and in the period (1974-2004) it was managed by Perum Perhutani, namely KPH Surakarta and KPH Magelang based on Government Regulation Number 15 of 1972 or Decree of the Minister of Agriculture Number 76/KPTS/UM/2/1974 (RPKH KPH Magelang 1987; RPKH KPH Surakarta 2007). Therefore, the management of the Mount Merbabu forest area generally focuses on something other than nature tourism but rather on producing forest

plants. In 2004, the Minister of Forestry, through the Decree of the Minister of Forestry Number 135/Menhut-II/2004, decided to change the function of the Protected Forest Area and Nature Tourism Park in the Mount Merbabu Forest Group covering an area of  $\pm$  5,725 ha to the Mount Merbabu National Park. The basis for considering the appointment was the existence of water sources for the lives of the surrounding community, protected flora and fauna, and the potential for nature tourism (BTNGMb 2014). With this decision, the Selo Climbing Route was officially managed by Mount Merbabu National Park under the responsibility of the Selo Resort, which was then established by the Selo Resort in 2007 in Tarubatang Village, Selo District, Boyolali Regency.

The Selo Hiking Trail tourist attraction is located in Tarubatang Village, in Genteng Hamlet, directly adjacent to the Selo Mount Merbabu National Park Hiking Trail Entrance. Tarubatang Village is located at an altitude of 1800 meters above sea level with an area of 380.4 Ha. Based on data from the Boyolali Regency BPS (2021), it is known that the population of Tarubatang Village is 2,762 people, with a composition of 1,398 male residents and 1,364 female residents. Administratively, Tarubatang Village borders Senden Village to the north, Selo Village to the south, Mount Merbabu National Park Forest Area to the west, and Cepogo Village, Cepogo District to the east. The majority of the population of Tarubatang Village is Muslim. Based on education, most of the residents in Tarubatang Village are elementary school graduates. Based on data from the BPS of Selo Regency (2021), the number of residents of Selo District who are elementary school graduates is 13,988 or 46.47%. The social life of the Tarubatang Village community still adheres to the philosophical values of Javanese culture, which can be seen from the preservation of local traditions, such as Merti Dusun, Sadranan ceremonies, life cycle ceremonies, Rosulan, Sholawatan, and gotong-royong activities that are still routinely carried out to this day.

The majority of the Tarubatang Village community work as farmers. Most of the population in Selo District aged ten years and over have their primary job as food and non-food crop farmers (BPS Boyolali Regency 2021). The indigenous people of Selo District have land that has been passed down from generation to generation and is used as agricultural land and a place to live. The location of Tarubatang Village, which borders the Selo Hiking Trail tourist attraction, provides opportunities for villagers to open businesses related to tourism activities, either as their main job or as a side job. In addition to the Tarubatang Village community, there are many people from Senden Village and Selo Village who contribute to the tourism sector on the Selo Hiking Trail as volunteers or workers. Therefore, what is then referred to as the community around the area in this study is the Tarubatang Village, Senden Village, and Selo Village communities.

### *3.2. General condition of the climbing route*

The Selo Climbing Route is located on the southern slope of Mount Merbabu and is accessed via the Boyolali-Magelang Highway. Therefore, the tourist attraction of the Selo Climbing Route can be accessed from both Magelang Regency and Boyolali Regency. The journey routes from Magelang Regency and Boyolali Regency to Selo District are now paved roads, making them easily passable. However, the roads are still relatively narrow and steep, which makes it difficult for large vehicles such as tourist buses to navigate. Nonetheless, there are plenty of public transports available to take tourists to the Selo Climbing Route so they won't encounter difficulties reaching the destination. Public transports are available at Boyolali Terminal, Magelang Terminal, and Cepogo Market. Tourists using private cars or motorcycles can directly access the tourist attraction without needing to transfer first.

Facilities and infrastructure in the Selo Hiking Trail tourist area have been developed quite well to support effective tourism management. Facilities available at the entrance include the Selo Resort Office, Mount Merbabu National Park entrance ticket counter, basecamp located in several residents' houses, toilets, prayer rooms, food stalls, and vehicle storage areas. Inside the area are trail signs, interpretation boards, and CCTV installed in

several locations to improve visitor safety and comfort. Although Mount Merbabu National Park management has introduced a breakthrough in GPS bracelets to improve tourist safety assurance, the system and technical implementation still need improvement. The physical condition of the facilities and infrastructure for hiking tourism activities is relatively good, thanks to new construction and attention to the maintenance of existing facilities.

### 3.3. Respondents characteristic

This study involved 190 respondents directly affected by tourism along the Selo Climbing Route. Respondents were divided into 4 groups, namely community members, tourists, business units, and employees. However, some community respondents also qualified as business unit respondents or employees based on specified criteria. Respondent characteristics in this study encompassed demographic details of community members, tourists, business units, and employees, as well as the tourism-related characteristics of the tourists surveyed.

#### 3.3.1 Characteristics of community respondents

The analysis of community respondent characteristics in this study is based on several demographic factors, including age, gender, population status, education, and primary occupation. These factors provide a comprehensive view of the respondents' profiles. An overview of the respondents' characteristics is presented in Table 2.

Table 2. Characteristic of respondents

Characteristics	Number of Respondents (people)	Percentage (%)
Age (year)		
≤20	0	0
21-30	5	16.67
31-40	10	33.33
41-50	11	36.67
>50	4	13.33
Total	30	100
Gender		
Male	21	70
Female	9	30
Total	30	100
Population		
Native Residents	27	90
Migrants	3	10
Total	30	100
Education		
Not Schooling	1	3.33
Elementary/equiv	7	23.33
JHS/equivalent	19	63.33
SHS/equivalent	3	10
Total	30	100

The community around the Selo Climbing Route tourist attraction is predominantly composed of native residents, accounting for 90%, with the remaining 10% being newcomers, typically through marriage with local residents. The majority of respondents fall within the age group of 31-50 years old, with 33.33% in the 31-40 age bracket and 36.67% in the 41-50 age bracket. Males dominate the gender composition of respondents, comprising 70%. Data from the Central Statistics Agency (BPS) of Boyolali District (2021) indicates that the population growth rate in Selo Subdistrict over the past decade was only 0.55, indicating a dominance of specific age groups in the community around the tourist attraction. The majority of residents work as farmers (93.3%), while the remainder are

entrepreneurs (6.7%), consistent with previous studies on the primary livelihoods of communities around Mount Merbabu National Park.

### 3.3.2 Characteristics of tourist respondents

Tourist respondents at the Selo Climbing Route tourist attraction come from various regions, with the majority (62%) originating from Central Java, followed by West Java, Jakarta, East Java, and other regions outside Java Island. This indicates that the Selo Climbing Route tourist attraction has broad appeal and is capable of attracting tourists from diverse areas. Data on the characteristics of tourist respondents at the Selo Climbing Route based on factors related to tourism can be seen in Table 3.

Table 3. Characteristics of tourist respondents in tourism

Characteristics	Number of Respondents (people)	Percentage (%)
Frequency of visits		
Once	67	67
Twice	22	22
Three times	6	6
≥ 4 times	5	5
Total	100	100
Reasons for choosing the route		
Scenery/view	53	53
Ease of access	14	14
Recommendation by friends	17	17
Facilities	14	14
Route safety level	2	2
Total	100	100
Transportation		
Private car	4	4
Motorcycle	46	46
Public transportation	25	25
Rental vehicle	7	7
Train	13	13
Plane	4	4
Ship	1	1
Total	100	100

Based on Table 3, the majority of tourists on the Selo Climbing Route obtain information about the tourist attraction from friends (65%) and social media (33%). The primary reason for choosing the Selo Climbing Route is its scenic panoramas or landscapes (53%), highlighting its attractiveness mainly in terms of natural attractions. However, only 2% of tourists choose it due to safety factors, underscoring the importance of enhancing security and tourist facilities. The most common duration of the trip is 2 days (69%), consistent with the typical ascent time to the summit of approximately ±10 hours, making this climb generally completed over two days.

Most tourists (97%) climb with friends, while a small portion (3%) are accompanied by family. The majority also travel in groups of 4-10 people (72%). Regarding transportation, tourists use private motorcycles (46%) and public transportation or buses (25%), influenced by limited access to the Selo Climbing Route which restricts transportation options.

### 3.3.3 Characteristics of business unit respondents

The analysis of tourism development along the Selo Climbing Route has opened business opportunities for local communities, leading to an increase in the number of business units such as basecamp operators, eateries, car rentals, souvenir vendors, and equipment rentals. The characteristics of these business units are detailed in Table 4.

Table 4. Characteristics of business unit respondents

Characteristics	Number of Respondents (people)	Percentage (%)
Types of business units		
Basecamp and eateries management	15	50
Car rentals	6	20
Souvenirs and equipment rentals	1	3.33
Souvenir sellers	2	6.67
Equipment rentals	6	20
Total	30	100
Residency status		
Native residents	30	100
Migrants	0	0
Total	30	100
Education		
No schooling	1	3.33
Elementary school or equivalent	3	10
Junior high school or equivalent	23	76.67
Senior high school or equivalent	2	6.67
Bachelor's degree	1	3.33
Total	30	100
Main occupations:		
Farmers	25	83.33
Private sector employees	1	3.33
Entrepreneurs	3	10
Volunteers	1	3.33
Total	30	100

Based on Table 4, it can be seen that all tourism business owners surveyed are local residents from around the Selo Climbing Route area. This is due to the majority land ownership by native Selo residents and customs respecting such land ownership. Basecamp management units and eateries dominate with a percentage of 50% out of a total of 30 business units surveyed. The location of these units tends to concentrate in Tarubatang Village due to its proximity to the park entrance. Most business owners have a maximum education level of junior high school or equivalent (76.67%), as education was not a primary focus in the region during that time, which prioritized agriculture. Data from Table 4 also indicates that a majority of business owners are still actively engaged in farming (83.33%), with tourism operations serving as a secondary occupation.

### 3.3.4 Characteristics of labor respondents

The presence of the Selo Climbing Route tourist attraction also provides employment opportunities for the local community, offering various types of jobs such as food stall attendants, drivers, porters, and guides. Additionally, there are social roles such as village ticket attendants and vehicle parking attendants that are not part of official business units. In terms of job types, the majority of labor consists of guides and porters, comprising 50% of the workforce, with approximately 70 local workers registered as guides and porters at the Mount Merbabu National Park office. This makes guides and porters the dominant job types at the Selo Climbing Route tourist attraction. The characteristics of labor respondents at the Selo Climbing Route can be seen in Table 5.

Based on Table 5, all workforce respondents along the Selo Climbing Route fall within the productive age range as defined by BPS (2019), which is between 15-64 years old. The majority of the workforce respondents are aged between 21-50 years, with only a small percentage (3.33%) being over 50 years old. Men dominate the workforce along the Selo Climbing Route, comprising 83.33% of respondents, largely due to the physical demands of roles such as porters, guides, and drivers. Data also indicates that all guide/porter and driver roles are filled by men, whereas women are predominantly engaged in occupations such as managing food stalls at basecamps and gardening. In terms of education, a majority



of the workforce respondents have completed up to junior high school or its equivalent, totaling 63.33%. This reflects similar educational levels observed among the local community and business owners along the Selo Climbing Route, who primarily focused on agricultural activities before the significant impact of climbing tourism emerged.

Table 5. Characteristics of labor respondents

Characteristics	Number of Respondents (people)	Percentage (%)
<b>Occupation</b>		
Basecamp caretaker	1	3.33
Kiosk attendant	6	20
Driver	8	26.7
Guide and Porter	15	50
Total	30	100
<b>Age</b>		
<20	0	0
21-30	8	26.67
31-40	12	40
41-50	9	30
>50	1	3.33
Total	30	100
<b>Gender</b>		
Male	25	83.33
Female	5	16.67
Total	30	100
<b>Education</b>		
No schooling	0	0
Elementary school or equivalent	9	30
Junior high school or equivalent	19	63.33
Senior high school or equivalent	2	6.67
Total	30	100
<b>Residential status</b>		
Native resident	29	96.67
Migrant	1	3.33
Total	30	100

### 3.4 Economic impact

The presence of tourist attractions along the Selo Climbing Route has significant economic impacts through the circulation of money from tourist expenditures. These expenditures are divided into two types: within the tourist attraction itself, such as in the Selo District, which serves as the buffer village of Mount Merbabu National Park, and outside the tourist attraction, including transportation, logistics, parking fees, meals, and accommodation. Transportation costs constitute the largest proportion of tourist expenditures, reaching 31.77%, because many tourists come from outside Boyolali Regency and use private vehicles or buses. This is also influenced by limited road access, which increases transportation costs for tourists visiting the Selo Climbing Route.

Table 6. Proportion of tourist expenditures and leakage

Cost	Average Expenditure (P) (IDR)	Proportion (%) ( $Q=P/c*100$ )
<b>Expenditures outside the tourist site</b>		
Transportation costs	183,350	31.77
Purchase of logistics	95,500	16.55
Equipment rental	21,500	3.73
Toll and parking fees	17,450	3.02
Meals during the journey	28,300	4.90
Accommodation	4,000	0.69
National park entrance ticket	20,000	3.47
<b>Total leakage (a)</b>	<b>370,100</b>	<b>64.13</b>

Expenditures inside the tourist site		
Meals	50,300	8.72
Purchase of logistics	35,500	6.15
Purchase of souvenirs	39,700	6.89
Accommodation	4,200	0.73
Toilet fees	3,830	0.66
Parking fees	5,200	0.90
Equipment rental	5,200	0.90
Porter/guide services	36,500	6.32

Based on Table 6, the cost of purchasing logistics constitutes a significant proportion of tourists' expenditures outside the Selo Climbing Route attractions, reaching 16.55%. Tourists purchase logistics for their climbing needs, given the limited facilities available within the tourist site. The average annual visits to the Selo Climbing Route amount to 48,086 visits, with a total economic leakage of IDR 17,797,276,270.00 per year, highlighting the substantial economic impact of tourism activities in the area (Table 7).

Table 7. Proportion of tourist expenditures and leakages

Cost	Average Expenditure (P) (IDR)	Proportion (%) (Q=P/c*100)
Motorcycle taxi/car rental service	23,400	4.05
Documentation service	3,200	0.55
Total expenditures within the tourist attraction (b)	207,030	35.87
Total tourist expenditures (c=a+b)	577,130	100
Average annual visits (d) (2017-2020)	48,086	
Total leakage per year (e=c*proportion a*d)	17,797,276,270	

### 3.4.1 Direct impacts

Business units in the tourism destination of the Selo Climbing Route consist of several types, including basecamps and eateries, car rentals, souvenir shops, and equipment rentals. These businesses operate daily due to the constant influx of tourists. The direct impact felt by these businesses is reflected in the owners' revenues. The calculation of direct impacts can be seen in Table 8.

The largest direct economic impact is felt by Baecamp & dining establishments, amounting to IDR 84,000,000. This is due to the majority of tourists requiring places to stay and eat before and after their climb. The proportion of tourists spending on meals within the tourist attraction is 100%, meaning all tourists spend on meals at the Baecamp & dining establishments within the tourist attraction. This explains why Baecamp & dining establishments have the highest total revenue compared to other business units. The total value of direct economic impact received by business units amounts to IDR 151,550,000 per month (Table 8).

Table 8 Direct economic impacts at the tourism destination of the Selo Climbing Route

Type of business unit (a)	Respondent business units (b)	Total number of business units (c)	Average monthly income (IDR) (d)	Proportion (%) (e=d/g*100)	Direct economic impact (IDR) (f=c*d)
Basecamp & eateries	15	15	5,600,000	28.44	84,000,000
Car rental service	6	6	6,091,667	30.94	36,550,000
Souvenirs and equipment rental	1	1	1,000,000	5.08	1,000,000
Souvenir vendors	2	2	3,000,000	15.23	6,000,000
Equipment rental	6	6	4,000,000	20.31	24,000,000
Total	30	30	19,691,667	100	151,550,000

### 3.4.2 Indirect Impact

Indirect economic impacts are derived from business unit expenditures within the tourist attraction and local workforce income at the Selo Climbing Route tourist attraction. Data on business unit expenditures within the tourist attraction can be found in Table 9. In Table 9, it is explained that the Basecamp & restaurant business unit has the highest monthly expenditure within the tourist attraction, totaling IDR 241,100,000.

Table 9. Business unit expenditures per month within the Selo Climbing Route tourist attraction

Type of business unit	Average expenditure inside the tourist attraction per month (IDR)		Total (a)	Number of business units (b)	Total expenditure inside the tourist attraction (IDR) (c=a*b)
	Purchase of raw materials (IDR)	Maintenance of equipment and cleanliness (IDR)			
Basecamp & eateries	15,633,333	440,000	16,073,333	15	241,100,000
Car rental	0	1,500,000	1,500,000	6	9,000,000
Souvenirs and equipment rental	3,000,000	100,000	3,100,000	1	3,100,000
Souvenir sellers	7,083,333	166,667	7,250,000	6	43,500,000
Equipment rental	0	200,000	200,000	2	400,000
Total				30	297,100,000

Meanwhile, according to Table 10, the car rental business unit has the highest expenditure outside the tourist attraction compared to other business units, amounting to IDR 32,600,000. This is because this business unit operates in transportation services for shuttle tourists from outside the tourist attraction, resulting in the largest expenditure on purchasing Fuel Oil (BBM). Most BBM purchases are made outside the tourist attraction due to the absence of fuel filling units within the tourist attraction. Data on expenditure of business units outside the tourist attraction can be seen in Table 10. Indirect economic impacts on the Selo Climbing Route tourism site arise not only from expenditures by businesses within the site but also from the income generated by the workforce there. The distribution of workforce income varies depending on the type of business unit involved. The overall indirect economic impact on the Selo Climbing Route tourism site is calculated by combining the total expenditures of businesses within the site and the total income generated by the workforce. Data on indirect economic impacts can be seen in Table 11.

Table 10. Expenditure of business units per month outside the Selo Climbing Route tourist attraction

Type of business unit	Average monthly expenditure outside tourist attractions (IDR)		Total (a)	Number of business unit (b)	Total expenditure outside tourist attractions (IDR) (c=a*b)
	Electricity (IDR)	Transportation (IDR)			
Basecamp & eateries	380,000	20,000	400,000	15	6,000,000
Car rental	0	5,433,334	5,433,334	6	32,600,000
Souvenirs and equipment rental	150,000	0	150,000	1	150,000
Souvenir sellers	116,666	50,000	166,666	6	1,000,000
Equipment rental	100,000	0	100,000	2	200,000
Total				30	39,950,000

Based on Table 11, the largest indirect economic impact at the Selo Climbing Route tourism site comes from the Basecamp & dining stalls business units, amounting to IDR 249,900,000. This is because these units contribute more significantly to the economy

compared to other business units, as reflected in their labor income and expenditures within the tourism site. In contrast, the equipment rental business unit records the smallest indirect economic impact at IDR 400,000, due to minimal equipment maintenance expenses and no labor costs, given that the business unit operates independently. Overall, the total indirect economic impact at the Selo Climbing Route tourism site amounts to IDR 344,700,000 per month.

Table 11. Indirect Economic Impacts at the Selo Climbing Route Tourism Site

Type of labor and business units	Number of Labor (a)	Average Labor Income (IDR) (b)	Total Labor Income (IDR) (c=a*b)	Total business unit expenditures within the tourist attraction (IDR) (d)	Total indirect economic impact (IDR) (e=c+d)
Guide & porter Business unit	15	1,726,667	25,900,000	0	25,900,000
Basecamp & food stalls	7	1,257,143	8,800,000	241,100,000	249,900,000
Car rental	8	1,612,500	12,900,000	9,000,000	21,900,000
Souvenirs & equipment rental	0	0	0	3,100,000	3,100,000
Souvenir vendors	0	0	0	43,500,000	43,500,000
Equipment rental	0	0	0	400,000	400,000
<b>Total</b>	<b>30</b>	<b>4,596,310</b>	<b>47,600,000</b>	<b>297,100,000</b>	<b>344,700,000</b>

### 3.4.3 Secondary Impacts

The extended economic impacts of the proportion of labor expenditures within the tourist attraction encompass costs such as food, transportation, education, and electricity, as documented in Table 12. Based on Table 12, expenditures within the tourist attraction exceed those outside it. The largest average proportion of labor expenditures is allocated to food costs, reaching 73.94%, while transportation and children's schooling costs are 8.89% and 7.48%, respectively. Electricity costs are not included in expenditures within the tourist attraction as the revenue goes to the State Electricity Company.

Table 18 Average proportion of labor expenditures per month at the Selo Climbing Route tourist attraction.

Labour	Proportion of expenditures within the tourist attraction per month (%)				Proportion of expenditures outside the tourist attraction per month (%)	
	Food expenses (a)	Transportation expenses (b)	Child's school expenses (c)	Total (%)	Electricity expenses (d)	Total (%)
Kiosk attendant	62.50	13.82	11.84	88.16	11.84	11.84
Driver	63.03	12.68	9.51	85.22	14.78	14.78
Guide & porter	70.24	9.05	8.57	87.86	12.14	12.14
Basecamp caretaker	100.00	0	0	100,00	0	0
<b>Average</b>	<b>73.94</b>	<b>8.89</b>	<b>7.48</b>	<b>90.31</b>	<b>9.69</b>	<b>9.69</b>

The continued economic impact at the Selo Climbing Route tourism site is derived from the multiplication of total employment, average total labor expenditure, and expenditure proportions. Based on the calculation results, the largest continued economic impact comes from guides and porters amounting to IDR 19,450,000 per month (Table 13). The overall continued economic impact at the Selo Climbing Route tourism site is IDR 37,450,000 per month.

Table 13 Economic impacts further within the Selo Climbing Route tourist attraction

Labour Force	Number of workers (a)	Average total spending within the tourist attraction (b)	Proportion of spending within the tourist attraction (%) (c)	Secondary economic impact (IDR) (d=a*b*c)
Kiosk attendant	6	1,266,667	88.16	6,700,000
Driver	8	1,775,000	85.22	12,100,000
Guide & porter	15	1,400,000	87.86	18,450,000
Basecamp caretaker	1	200,000	100	200,000
Total				37,450,000

### 3.4.4 Multiplier Effect Economic Value

The multiplier effect value impact is used to measure how much economic influence tourism has on the surrounding communities. Marine Ecotourism for the Atlantic Area (META) (2001) distinguishes the economic impacts of tourism on local communities into two categories: the Keynesian Local Income Multiplier, which indicates the increase in local income from tourist expenditures, and the Ratio Income Multiplier, which measures the direct impact of tourist expenditures on the local economy. Table 14 presents data on the multiplier effect values, encompassing both indirect and subsequent impacts of tourism on the local economy.

Table 14: Multiplier Effect Values from Tourist Expenditures at the Selo Climbing Route Tourism Site

Multiplier	Value
Keynesian Income Multiplier	0.6
Ratio Income Multiplier Tipe I	3.3
Ratio Income Multiplier Tipe II	3.5

Based on Table 14, the Keynesian Income Multiplier value for the Selo Hiking Trail tourist attraction is 0.6, which means that every 1 rupiah increase in tourist spending will impact the local economy by 0.6 rupiah. The type I Income Multiplier Ratio value of 3.3 indicates that every 1 rupiah increase in business unit revenue results in an increase in income of 3.3 rupiah for business unit owners and workers at the tourist attraction. Meanwhile, the type II income multiplier ratio value of 3.5 indicates that every 1 rupiah increase in business unit revenue increases by 3.5 rupiah in business unit owner income, worker income, and worker spending at the tourist attraction. The Keynesian Income Multiplier value between zero and one ( $0 < x < 1$ ) indicates that the Selo Hiking Trail tourist attraction still has a low economic impact caused by the proportion of leakage or tourist spending outside the tourist attraction, which is more significant than spending inside the tourist attraction. However, the Ratio Income Multiplier type I and type II values indicate that this tourist attraction has a positive economic impact on the surrounding community, with values greater than one ( $\geq 1$ ). This confirms the importance of the existence of the Selo Hiking Trail tourist attraction for the local economy and shows the need for efforts to maintain and improve this tourist attraction. To increase the economic impact, efforts must be made to reduce leakage by improving facilities and business units around the tourist attraction.

## 4. Conclusions

The development of tourism along the Selo Climbing Route has positive economic impacts on the surrounding communities, despite its relatively low Keynesian Income Multiplier value of 0.6. This is due to the high proportion of leakage or tourist expenditures outside the tourism site, such as transportation costs and logistical purchases. However, the Type I Ratio Income Multiplier value of 3.3 and Type II Ratio Income Multiplier value of 3.5 indicate that the Selo Climbing Route tourism site significantly contributes to the local

economy, with larger expenditures focused on businesses within the tourism area. Based on the research, it was found that the level of leakage or tourist spending outside of tourist attractions, such as transportation costs and logistics purchases, is relatively high. This finding can be a reference for developing innovations in new business units, such as grocery stores or minimarkets and fuel stations, which can meet the needs of tourists. To enhance the broader economic impact of tourism on the community, further research development is needed on culturally based tourism in villages or Community Based Tourism. This approach is expected to expand the economic benefits of tourism activities and reduce economic leakage outside the tourism site.

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