

RISK ANALYSIS OF MENGANTI BEACH TOURISM, KEBUMEN DISTRICT, CENTRAL JAVA

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Abstract

Menganti Beach is one of the tourist attractions in Kebumen, which is visited by many tourists. The most visited beach tourism in Central Java province. However, there is a potential risk of danger for visitors. As a tourist attraction that is visited by many tourists, it is felt necessary to study the potential in every activity carried out. This research aims to identify risks and impacts of risks to maintain the sustainability of this tourist attraction. The method used is HIRADC. The method used in this research is HIRADC (Hazard Identification, Risk Assessment, and Determining Control). The research results show that there are 17 potential risks of doing activity. Of these 17 potential hazards and risks were found. Based on the severity index calculation of the level of probability and level of risk impact, we obtained 2 high risks, 1 medium risk and 14 low risks. The proposed risk control in this research is to create Standard Operating Procedures (SOP), provide advice and supervision to tourists, regularly carry out inspections in areas where there are sources of hazard, give training to managers, carry out repairs in areas where there are sources of danger.

Keywords: Hazard; Risk; Safety; Tourism, HIRADC

INTRODUCTION

Tourism is one of the leading sectors that plays a vital role in supporting Indonesia's economic growth. With its abundant natural beauty and rich cultural diversity, Indonesia possesses great potential for sustainable tourism development. In addition to serving as a source of revenue for both local and national governments, tourism also provides opportunities for local communities to interact, engage in economic transactions, and improve their livelihoods through activities related to tourist visits (1). According to the World Economic Forum, Indonesia ranks 32nd out of 117 countries and is positioned as the second-highest in ASEAN after Singapore. This achievement reflects Indonesia's growing competitiveness in the global tourism sector, supported by its rich natural resources, diverse cultural heritage, and improving infrastructure. The ranking also indicates that Indonesia has made significant progress in developing sustainable tourism and enhancing its attractiveness as an international destination, although further efforts are still needed to strengthen aspects such as environmental management, digital innovation, and service quality to compete more effectively at the global level (2).

Central Java is one of Indonesia's provinces actively engaged in developing regional tourism. This effort is supported by the Central Java Governor Regulation No. 6 of 2015, which implements Regional Regulation No. 10 of 2012 concerning the Master Plan for Tourism Development of Central Java Province for 2012–2027. The regulation serves as a foundation for formulating policies, setting provisions, and expanding regions designated as Tourism Destination Development Areas (3)(4). Kebumen Regency, whose capital is Kebumen City, is one of the districts in Central Java that possesses diverse tourism potential, particularly in historical and natural attractions. Its coastal location makes it home to several beautiful beaches such as Menganti Beach, Lumut Beach, and Surumanis Beach (5). Menganti Beach stands out as one of the most popular destinations in Kebumen Regency. Currently, Menganti Beach is still undergoing development, making it essential to continually evaluate tourism development strategies through assessments of visitor satisfaction.

Menganti Beach is one of the tourist attractions in Central Java province. Natural tourism around the coast is one of the potential areas that has been widely developed in this region (6). The southern coast of Java, including Menganti Beach, is characterized by high waves and steep coastal terrain, which pose significant safety risks for visitors. These natural conditions can lead to accidents and even loss of life if not properly managed, especially during periods of strong currents or unpredictable weather. Therefore, understanding and managing these risks wisely is crucial to maintaining the safety of tourists while ensuring the long-term sustainability of the beach as a tourism destination (7). Given these potential dangers, it is essential to conduct a comprehensive study on hazard risk identification for both tourism actors and visitors at the site. Such research can provide valuable insights for local authorities and tourism managers in formulating effective mitigation strategies. Through proper risk assessment, preventive measures such as installing warning signs, enforcing safety regulations, and conducting regular monitoring can be implemented to minimize hazards, enhance tourist safety, and support sustainable tourism development in the area.

Previous research conducted by Abreu et al. (2020) explains that the study on coastal management risk analysis of Cala Millor Beach in Majorca Island reveals that the beach experiences continuous sediment loss due to human activities that have disrupted its natural balance since the 1960s. The presence of *Posidonia oceanica*, a native seagrass, plays a crucial role in stabilizing the coastal system by dissipating wave energy and shaping coastal morphology. Therefore, any proposed management or restoration measures must carefully consider local ecological characteristics to mitigate risks effectively and ensure sustainable coastal protection (8).

Research by Dagustani et al., (2022) also explains that the implementation of risk management is essential in developing coastal tourism in West Java, especially when combining eco-tourism and mass tourism approaches. Through quantitative and qualitative analyses, various potential risks were identified and prioritized to support safer and more sustainable tourism planning. The results highlight that applying structured risk management can enhance decision-making, minimize potential losses, and strengthen the long-term development of coastal tourism areas (9).

Krisnawati (2022) reminds us that Kebumen has a history of ancient tsunamis and is located in a tsunami-prone zone. Various mitigation measures have been implemented, such as public education, socialization, installation of early warning systems, disaster simulations, and the establishment of evacuation routes and maps by relevant agencies such as BMKG, BPBD, BNPB, and PMI. Effective disaster communication requires an understanding of the community's information needs, leadership commitment, situation analysis, and media collaboration in conveying information accurately to the public. The results of the study show that disaster mitigation in Kebumen Regency has been carried out through interactive communication strategies involving various levels of society and relevant agencies, supported by the development of standard operating procedures to improve preparedness and minimize casualties in the event of a tsunami (10).

The novelty of the study Risk Analysis of Menganti Beach Tourism, Kebumen District, Central Java lies in the application of the HIRADC (Hazard Identification, Risk Assessment, and Determining Control) method specifically to identify potential hazards and assess the level of risk in tourism activities at Menganti Beach, one of the most popular coastal destinations in Central Java. Unlike previous studies that focused on coastal risk management related to erosion and tourism development combining eco-tourism and mass tourism approaches, this research emphasizes visitor safety by directly identifying sources of hazards and prioritizing risk control measures in the field. The main objective of this study is to analyze and evaluate potential risks arising from tourism activities and to formulate effective control measures to support the sustainability and safety of Menganti Beach as a tourist destination.

METHOD

The research was carried out in July 2024-August 2024 through several stages, namely, survey stage, data collection and data processing. The research was conducted in the Menganti Beach Tourism Area, Kebumen Regency, Central Java. The approach taken with HIRADC. Data collection was carried out using survey methods through interview and observation techniques. The data collected consists of primary data and secondary data. Primary data was obtained through questionnaires, field observations and interviews with experts. The secondary data used was obtained through literature studies and reports from various related agencies including the Tourism and Sports Office of the Regional Government of Kebumen Regency, while the primary data was obtained from filling out questionnaires by conducting direct interviews with stakeholders including institutional leaders, tourism awareness groups and academics. HIRADC (Hazard Identification and Risk Assessment Determining Control) is a method or technique for identifying events or conditions that have the potential to have a risk of danger by reviewing the characteristics of hazards that may occur and evaluating the risks that occur through risk assessment using a risk assessment matrix (11). Hazard identification by identifying processes and areas in all activities, identifying as many occupational safety and health aspects as possible in each process or area that has been previously identified and identification is carried out under all conditions, whether normal, abnormal, emergency or maintenance conditions (12). HIRADC consists of three steps, namely hazard identification, risk assessment and determining control.

a) Hazard Identification

Hazard identification is carried out to know the potential dangers faced by people while working. These dangers must be discovered immediately before they have a detrimental impact on the company. This stage can be carried out by conducting interviews, observations, and through historical data (6).

b) Risk Assessment

Risk assessment is used to determine the priority of the magnitude of possible accidents that could occur and the size of the impact that will be received. In the risk assessment, a severity index calculation will be used which will then produce quantitative criteria and will be categorized as risk leveling. The assessment is carried out as a step to increase the level of risk in terms of the likelihood of occurrence and the severity it causes. The risk assessment scale used along with its description can be seen in Table 1, Table 2 and Table 3.

Table 1 Score level of risk frequency

Level	Description	Detail
1	Rare	Rarely happen

2	Unlikely	Seldom happen
3	Possible	Sometimes happen
4	Likely	Used to be happen
5	Almost certain	Almost happen

Table 2 Score level of severity risk

Level	Description	Detail
1	Insignificant	No injuries, small financial lost
2	Minor	Minor injury, slight financial loss
3	Moderate	Moderate injury, need for medical attention, major financial loss
4	Major	Serious injury > 1 person, major loss,
5	Catastrophic	Fatal injury > 1 person, very large losses, very wide impact, cessation of all activities

c) Determining Control

This control can be carried out by the organization in stages starting from the highest risk rating to the lowest. Control can be done by reducing the likelihood and reducing the severity. Control can also be carried out by partially or completely transferring risk (risk transfer) and avoiding risk (risk avoidance). Risk control is carried out based on a control hierarchy consisting of elimination, substitution, engineering control, administrative control and PPE. Dangers with risk levels "moderate", "high", and "extremely high" must be followed up.

Table 3. Level Impact of Risk

Risk Frequency	Severity Risk				
	1	2	3	4	5
1	L	L	M	M	H
2	L	L	M	M	H
3	L	M	H	H	H
4	M	M	H	H	E
5	M	H	H	E	E

RESULT AND DISCUSSION

Menganti Beach has white sand which is rarely found on other beaches on the southern coast of Java. Surrounded by green hills and towering coral cliffs, Menganti Beach is often nicknamed "Central Java's New Zealand". Menganti Beach is surrounded by steep green hills and towering coral cliffs which provide a spectacular panorama and is often used as a place for visitors to take photos or enjoy the view from a height. For tourists who want to experience a different experience, camping at Menganti Beach is an attractive choice. With views of the clear night sky and the calm sound of the waves, the camping experience here will be very enjoyable. The selection of the objects above was based on several inputs from stakeholders, here with the Kebumen Regency Tourism Office, BPPD, tourist attraction managers and tourism actors. The input objects from around 25 existing beach objects with consideration of several beach clusterings are represented as follows, including the beach most visited by tourists (Menganti Beach). The initial identification results generally found that there were 17 risks of traveling to Menganti beach as follows:

Table 4. Potential risk at Menganti beach

No	Potential Risk
1.	Vehicle crashed during reach the location
2.	Accidents between tourist/management vehicles
3.	Trouble at vehicle transportation
4.	Earthquake
5.	High wave
6.	Tsunami
7.	Forrest fired
8.	Fires in accommodation and supporting facilities
9.	Disruption of clean water supply and distribution
10.	Disruption of sanitation facilities
11.	Injured during tourist activities
12.	Rolled by waves
13.	Sea animal attacks

No	Potential Risk
14.	Drowning during tourist activities
15.	Falling from a height during tourist activities
16.	Extreme temperatures
17.	Piles of rubbish at tourist sites

Table 4 outlines various potential risks that may occur in the Menganti Beach tourism area. The first three risks relate to transportation and accessibility to the site. The winding and steep roads leading to Menganti Beach create the possibility of vehicle accidents, either during the journey to the location or within the parking and internal areas of the site. Collisions between tourist and management vehicles can also occur due to limited space or a lack of proper traffic management in the area. Furthermore, mechanical problems such as engine failure or vehicle breakdowns pose additional risks that could disrupt tourist activities. Previous research found that poor road conditions and limited transportation management significantly affect the safety perception of tourists in coastal destinations. Hence, infrastructure development and transportation safety management play essential roles in minimizing these risks and improving accessibility for visitors (13).

Risks four through seven reflect natural hazards that may threaten the area. Menganti Beach is located along the southern coast of Java Island, which is prone to earthquakes and tsunamis due to its proximity to the subduction zone between the Indo-Australian and Eurasian tectonic plates. Earthquakes may trigger high waves or even tsunamis that endanger visitors. In addition, forest fires in the surrounding hills or dry areas can occur during prolonged dry seasons, threatening both tourist safety and the local environment. According to previous study tell that, the southern coastal line of Java is part of an active tectonic zone where large-magnitude earthquakes and subsequent tsunamis are possible. The study emphasizes the importance of disaster preparedness and communication strategies in mitigating these risks, including evacuation routes, early warning systems, and public awareness programs. In line with this, proper dissemination of disaster information and community involvement are vital to strengthening the resilience of tourism sites like Menganti Beach against natural hazards (4).

The eighth to tenth risks concern the reliability of infrastructure and supporting facilities. Fires in accommodations, restaurants, or stalls can result from human negligence or unsafe electrical installations. Disruptions to clean water supply and sanitation systems may cause discomfort to visitors and increase the risk of disease. Therefore, proper management of basic facilities such as water distribution and hygiene systems is essential to maintain a safe and comfortable tourism environment. A study highlights that weak maintenance systems and the absence of risk management plans in tourism infrastructure increase vulnerability during peak tourist seasons. Ensuring regular maintenance, providing fire safety equipment, and guaranteeing clean water supply are essential measures for sustainable tourism development. These aspects are crucial not only for safety but also for maintaining the reputation and reliability of Menganti Beach as a tourist destination (15).

Risks eleven to fifteen are mainly related to tourist activities on the beach. Injuries may occur during physical activities such as swimming, playing on the sand, or climbing nearby cliffs. Tourists are also at risk of being swept away by large waves, attacked by sea animals like jellyfish, or even drowning when swimming too far from the shore. Moreover, the cliffs around Menganti Beach are quite steep, making falls from height a serious hazard that requires warning signs and restricted access to risky areas. On coastal tourism in Bantul Regency found that inadequate supervision and the absence of safety signs significantly contributed to the number of drowning cases. Therefore, the implementation of preventive measures such as lifeguard deployment, safety signage, and educational programs about sea conditions is necessary to protect tourists from avoidable accidents (16).

Finally, risks sixteen and seventeen relate to environmental and cleanliness conditions. Extreme temperatures whether intense heat or strong winds can pose health risks such as dehydration or fatigue among tourists. The accumulation of waste in the tourist area is another serious issue, as it can damage the natural beauty of the beach and reduce its attractiveness to visitors. Therefore, good environmental management and visitor awareness of cleanliness are crucial to ensuring the sustainability of Menganti Beach as a tourism destination. Previous studies revealed that environmental degradation due to waste accumulation not only reduces tourist satisfaction but also threatens local ecosystems. Effective waste management systems and environmental education programs for visitors are therefore critical. Similarly, adaptation strategies to cope with extreme temperatures, such as providing shaded areas and hydration facilities, can help maintain tourist comfort and health (17).

In conclusion, the various risks identified at Menganti Beach reflect the multidimensional nature of coastal tourism safety management. Learning from previous studies, an integrated risk management approach that combines infrastructure improvement, disaster preparedness, visitor education, and environmental conservation is essential. This comprehensive strategy will not only reduce potential hazards but also enhance the long-term sustainability and attractiveness of Menganti Beach as one of the leading coastal tourism destinations in Central Java.

Risk assessment is carried out after obtaining the severity index value from the level of possibility and level of impact of each risk variable. According to Maulana et al. (2025), The severity index value in the form of a percentage (%) is first converted into a probability and impact matrix level which can be seen in Table 6 and Table

7 (18). The results of the mapping carried out on the risk impact of traveling on Menganti beach, Kebumen, are as follows in Table 6. As table below shown there are high risk impact

Table 6. Impact of Risk at Menganti Beach

No	Potential Risk	Frequency Risk Score	Severity Risk Score	Impact Risk Score	Level Risk
1	Vehicle crashed during reach the location	2	2	3,1	Low Risk
2	Accidents between tourist/management vehicles	2	2	2,8	Low Risk
3	Trouble at vehicle transportation	2	1	2,1	Low Risk
4	Earthquake	1	1	1,4	Low Risk
5	High wave	3	1	4,0	Low Risk
6	Tsunami	1	1	1,6	Low Risk
7	Forrest fired	1	1	1,3	Low Risk
8	Fires in accommodation and supporting facilities	1	2	1,8	Low Risk
9	Disruption of clean water supply and distribution	1	1	1,4	Low Risk
10	Disruption of sanitation facilities	2	2	3,6	Low Risk
11	Injured during tourist activities	1	1	1,9	Low Risk
12	Rolled by waves	3	3	7,9	High Risk
13	Sea animal attacks	2	2	3,1	Low Risk
14	Drowning during tourist activities	3	3	9,2	High Risk
15	Falling from a height during tourist activities	1	2	2,0	Low Risk
16	Extreme temperatures	1	1	1,4	Low Risk
17	Piles of rubbish at tourist sites	3	2	6,5	Moderate Risk

Table 6 presents the analysis of the impact of risk at Menganti Beach, which includes three main indicators: frequency risk score, severity risk score, and impact risk score. Based on the results, most potential risks fall under the low-risk category, indicating that these risks have a relatively low probability and minimal impact on tourist safety and tourism operations. Low-level risks include vehicle accidents, transportation problems, earthquakes, forest fires, disruptions to water supply and sanitation, and minor injuries during tourist activities. Although individually these risks may not be severe, their cumulative effects can still influence visitor comfort and the quality of the tourism experience if not properly managed.

However, two risks are classified as high risk, namely “rolled by waves” and “drowning during tourist activities,” with impact scores of 7.9 and 9.2 respectively. These risks represent the most serious threats at Menganti Beach, particularly because they are directly related to interactions with the ocean. The southern coast of Java, where Menganti Beach is located, is known for its powerful and unpredictable waves. Research by Wilks found that most drowning accidents occurred due to a lack of supervision and tourists’ limited knowledge of dangerous sea conditions. Therefore, preventive measures such as deploying lifeguards, installing warning signs, and providing safety education are essential strategies to reduce these high-level risks (19).

One other risk falls into the moderate-risk category—“piles of rubbish at tourist sites”—with a score of 6.5. Although this risk does not pose a direct threat to human life, it has serious environmental and aesthetic implications. Waste accumulation can lead to pollution, damage coastal ecosystems, and decrease the attractiveness of the tourism site. Environmental cleanliness directly affects visitor satisfaction and the sustainability of beach destinations. To mitigate this risk, effective waste management practices such as providing adequate waste disposal facilities, encouraging visitor responsibility, and involving local communities in environmental preservation are necessary (20).

Meanwhile, other risks such as fires in accommodation facilities, transportation issues, and sanitation disruptions remain in the low-risk category but should not be ignored. Even low-level infrastructure risks can gradually undermine tourism quality and the reputation of a destination if left unmanaged. Regular maintenance of roads, clean water systems, and electricity, along with safety inspections, can help ensure consistent service quality and visitor safety (21).

Overall, the findings from Table 6 suggest that while most risks at Menganti Beach are classified as low, particular attention must be given to sea-related and environmental risks. Strengthening beach safety systems, enhancing supervision, and implementing sustainable tourism practices are crucial steps toward reducing both high and moderate risks. A comprehensive risk management approach that integrates safety, infrastructure maintenance, and environmental conservation will help ensure that Menganti Beach remains a safe, sustainable, and attractive coastal destination for both domestic and international tourists.

Based on the results of the research conducted, it can be concluded that Menganti Beach has a total of 17 identified potential hazards related to tourism activities. The risk assessment results show that there are 2 high-risk hazards, 1 medium-risk hazard, and 14 low-risk hazards, with the most significant threat being wave-related incidents that could result in fatalities. To minimize these risks, several control measures are recommended, including the development of Standard Operating Procedures (SOP), providing guidance and supervision to tourists, installing warning signs, conducting regular inspections in areas prone to hazards, ensuring the use of Personal Protective Equipment (PPE), and offering regular training for beach management personnel to enhance safety and preparedness.

CONCLUSION

Based on the results of the research that has been carried out, several conclusions can be drawn as follows.

1. Based on the results of observations that have been made, it was found that at Menganti beach there are 17 potential hazards.
2. The level of risk found from tourism activities at Menganti Beach based on the severity index results of the probability level and impact level consists of 2 high risks, 1 medium risk and 14 low risks. The high risk was rolled by wave danger during tourist activities, resulting caused death.
3. Proposed control efforts include creating Standard Operating Procedures (SOP), providing advice and supervision to tourists, installing signs, regularly carrying out inspections in areas of danger sources, using Personal Protective Equipment (PPE), and providing training to managers regularly.

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REFERENCES

1. W. A. Suwarso, "Peran Masyarakat dalam Promosi Pariwisata Kota Singkawang," J. PIKMA: Publ. Ilmu Komun. Media Dan Cinema, vol. 3, no. 2, pp. 146–156, 2021, doi: 10.24076/pikma.v3i2.474.
2. L. Uppink and M. Soshkin, "Travel & tourism development index 2021: Rebuilding for a sustainable and resilient future," World Econ. Forum (Insight Rep. May 2022), p. 91, 2022, [Online]. Available: https://www3.weforum.org/docs/WEF_Travel_Tourism_Development_2021.pdf
3. A. K. Jaelania and L. Karjoko, "Development of halal tourism destinations in the era of regional autonomy in West Nusa Tenggara Province," Development, vol. 12, no. 12, pp. 765–774, 2020.
4. S. H. Utomo, D. Wulandari, B. S. Narmaditya, S. Ishak, P. H. Prayitno, S. Sahid, and L. A. Qodri, "Rural-based tourism and local economic development," J. Econ. Dev. Stud., vol. 8, no. 2, pp. 101–115, 2020. <https://doi.org/10.30892/gtg.31330-553>
5. F. A. Nugroho, A. Sutono, and T. Sopian, "The influence of destination attributes on tourists' length of stay in Kebumen Regency, Central Java," J. Bus. Manag., vol. 22, no. 1, pp. 40–50, Mar. 2021.
6. BPS. "Kabupaten Kebumen Dalam Angka 2024." Vols. 36, 2024, Kota Kediri Dalam Angka. 2024. 1–491 p.
7. Al Abror BH, Manullang OR. "Layanan Transportasi dalam Pengembangan Pariwisata di Kabupaten Kerinci." J Manaj Transp Logistik. 2019;6(2):125.
8. T. Abreu, B. Parreño-Mas, and J. Pinto-Faria, "Coastal management risk analysis of an embayed beach in Majorca Island," SN Appl. Sci., vol. 2, p. 1535, 2020, doi: 10.1007/s42452-020-03325-6.
9. D. Dagustani, G. I. Kurniawan, H. A. Vidyastuti, and R. Miharja, "Implementation of risk management as an effort to develop the potential of beach tourism," in Emerald Publishing, ch. 19, 2022, doi: 10.1108/978-1-80262-431-120221017.
10. E. Krisnawati, "Communication strategy for tsunami disaster mitigation in tourist areas on the South Coast of Java Island (case study of the South Coast of Kebumen Regency)," in Proc. Int. Conf. Commun. Sci. (ICCS), vol. 2, no. 1, 2022, doi: 10.29303/iccsproceeding.v2i1.40.
11. Ridwan A, Nuroni A, Adelia A, Sonda A. "Analysis of occupational health and safety at a maritime warehouse using Hazard Identification, Risk Assessment and Risk Control (HIRARC)." J Ind Serv. 2022;8(2):187–92.
12. Surahman D, Pratiwi S. "Identifikasi Bahaya Dan Penilaian Resiko Di Kawasan Wisata Leuwi Kenit , Ciletuh Pelabuhanratu Ugg Hazard Identification and Risk Assessment in the Leuwi Kenit Tourism Area , Ciletuh Pelabuhanratu Ugg." J Geosci Eng Energy. 2024;5(01):1–12.
13. G. Lukoseviciute and T. Panagopoulos, "Management priorities from tourists' perspectives and beach quality assessment as tools to support sustainable coastal tourism," Ocean Coast. Manag., vol. 208, p. 105646, Jul. 2021, doi: 10.1016/j.ocecoaman.2021.105646.

14. J. Jumadi, K. D. Priyono, C. Amin, A. Saputra, C. Gomez, K.-C. Lam, A. Rohman, N. Patel, F. Sattar, M. Nawaz, and K. S. Wardani, "Tsunami risk mapping and sustainable mitigation strategies for megathrust earthquake scenario in Pacitan coastal areas, Indonesia," *Sustainability*, vol. 17, no. 6, p. 2564, 2025, doi: 10.3390/su17062564.
15. P. P. Santos, C. Reyes-Carmona, S. Pereira, R. Sarro, M. Martínez-Corbella, M. À. Coll-Ramis, J. L. Zêzere, and R. M. Mateos, "Seasonal rockfall risk analysis in a touristic island: Application to the Tramuntana Range (Mallorca, Spain)," *Int. J. Disaster Risk Reduct.*, vol. 101, p. 104264, Feb. 2024, doi: 10.1016/j.ijdrr.2024.104264.
16. I. Amri, S. R. Giyarsih, and D. Ruslanjari, "Enhancing tourism safety: An assessment of institutional preparedness for tsunami risk reduction in coastal destinations," *J. Coast. Conserv.*, vol. 29, p. 6, 2025, doi: 10.1007/s11852-024-01096-5.
17. Q. B. Baloch, S. N. Shah, N. Iqbal, et al., "Impact of tourism development upon environmental sustainability: A suggested framework for sustainable ecotourism," *Environ. Sci. Pollut. Res.*, vol. 30, pp. 5917–5930, 2023, doi: 10.1007/s11356-022-22496-w.
18. S. Maulana, R. Siswanto, A. Gunawan, L. Marantica, and S. Sumarman, "Analysis of risk management that affects the reconstruction project of the West Java provincial road section using the Severity Index (SI) method," *J. Syntax Transform.*, vol. 6, no. 2, 2025, doi: 10.46799/jst.v6i2.1064.
19. J. Wilks, "Safety in coastal and marine tourism," in *Tourist Health, Safety and Wellbeing in the New Normal*, J. Wilks, D. Pendergast, P. A. Leggat, and D. Morgan, Eds. Singapore: Springer, 2021, ch. 17, doi: 10.1007/978-981-16-5415-2_17.
20. R. A. Karim, M. K. Rabiul, and S. M. Arfat, "Factors influencing tourists' behavioural intentions towards beach destinations: The mediating roles of destination experience and destination satisfaction," *J. Hosp. Tour. Insights*, vol. 7, no. 4, pp. 2033–2054, 2024, doi: 10.1108/JHTI-04-2023-0276.
21. M. Carlbäck, T. Nygren, and P. Hägglund, "Human resource development in restaurants in Western Sweden – A human capital theory perspective," *J. Hum. Resour. Hosp. Tour.*, vol. 23, no. 2, pp. 289–314, 2023, doi: 10.1080/15332845.2024.2282215.