

RESILIENCE AND REBIRTH: THE IMPACTS OF POST-DISASTER RECOVERY, COMMUNITY INVOLVEMENT, AND SUSTAINABLE PRACTICES ON TOURISM RESILIENCE

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ABSTRACT

Natural disasters can significantly damage tourism, but with resilience and strategic recovery efforts, affected destinations can emerge stronger and more sustainable. This study examined the strategies employed to revive the tourism industry in Batangas, with a focus on post-disaster recovery, community engagement, and sustainable practices. The research aimed to supplement existing recovery plans by identifying new ideas and activities that could improve government initiatives following a disaster. The respondents were 381 residents who had lived in Talisay, Batangas, for 5 to 10 years, a community directly affected by these disasters. Respondents were selected through purposive sampling to ensure the data came from individuals who had first-hand experience with the impact of a disaster and the recovery process. Data was collected using questionnaires to gather insights on community participation, perceptions of recovery activity effectiveness, and sustainable tourism strategies. Descriptive and inferential analyses were used to analyze the data and identify key findings. Results showed that all three factors significantly influenced tourism resilience, with regression analysis revealing strong predictive relationships: post-recovery strategies ($R^2 = 0.520$), community involvement ($R^2 = 0.456$), and sustainable practices ($R^2 = 0.505$), all with p -values $< .001$. Environmental initiatives were rated more effective than economic recovery efforts, and community participation emerged as a key driver of adaptive capacity. These findings underscore the importance of integrated, community-driven, and sustainability-oriented approaches in post-disaster tourism recovery. These findings provide policymakers and tourism stakeholders with actionable insights to design inclusive, sustainability-driven recovery frameworks that enhance resilience and support long-term industry revitalization in Batangas.

Keywords: *Community involvement, Disaster recovery, Sustainable practices, Natural disasters, Tourism Resilience*

INTRODUCTION

Natural disasters are a global phenomenon, with their frequency and intensity increasing over time (Loayza et al., 2012; Rouhanizadeh et al., 2020). For tourism-dependent destinations, hazards such as earthquakes, floods, typhoons, and volcanic eruptions disrupt infrastructure, damage attractions, and weaken visitor confidence (Ganoe, Roslida & Sihotang, 2023). These impacts extend beyond physical destruction, often resulting in financial losses, employment displacement, and prolonged declines in tourist arrivals (Ichinosawa, 2006; Rosselló et al., 2020). As tourism systems are highly interconnected, disturbances in transportation, utilities, and hospitality services can disrupt the entire destination economy.

However, disasters do not entirely represent disruption; they also present opportunities for systemic transformation. Drawing on the Disaster Resilience Framework and principles of the Community-Based Disaster Risk Reduction, resilience is understood as the capacity of a system to absorb shocks, adapt to changing conditions, and reorganize while maintaining its core functions. Within tourism research, resilience emphasizes adaptive capacity, stakeholder collaboration, and sustainable reconstruction. Rather than viewing recovery as a return to pre-disaster conditions, contemporary literature frames it as a process of strengthening governance structures, infrastructure systems, and community networks to better withstand future disturbances.

Existing studies consistently highlight three interrelated drivers of tourism, which are effective post-disaster recovery strategies, active community involvement, and sustainable development practices. Post-disaster recovery involves restoring critical services and infrastructure while simultaneously enhancing long-term preparedness. Community participation, meanwhile, strengthens local ownership, improves decision-making, and reinforces social capital factors that are central to adaptive capacity. Sustainability principles further ensure that economic revitalization does not compromise environmental integrity or community well-being. Taken together, these strands of literature suggest that tourism resilience is multidimensional and dependent on coordinated institutional, environmental, and social responses.

Despite these insights, prior research has largely examined these elements independently or through qualitative case analyses. Limited studies have quantitatively tested how post-disaster recovery efforts, community involvement, and sustainable practices collectively predict tourism resilience, particularly in highly disaster-prone developing regions. This lack of empirical validation constrains theoretical advancement and policy formulation, as resilience frameworks require measurable indicators to inform evidence-based planning.

The Philippines, frequently identified as one of the world's most disaster-prone countries (Doroteo, 2015), provides a critical context for resilience research. Provinces such as Batangas in Region IV-A experience

recurrent typhoons and volcanic activity, which significantly affect tourism operations. While national-level studies have explored disaster recovery and sustainable tourism strategies, there remains limited region-specific quantitative research examining how recovery initiatives, community engagement, and sustainability practices interact to influence tourism resilience in this locality. Therefore, a clear empirical gap exists in understanding the predictive relationships among these factors within Region IV-A. Although sustainability is widely conceptualized as encompassing economic, environmental, and socio-cultural dimensions, the present study focuses on economic, environmental, and community-based aspects. The socio-cultural dimension, while critically important, often requires qualitative methodologies to effectively capture identity restoration, heritage preservation, and cultural meaning making processes (Monteil et al., 2019). Given the quantitative design of this study and its objective to statistically examine predictive relationships, including socio-cultural variables would have required methodological approaches beyond the scope of this research. Future investigations employing mixed or qualitative methods are encouraged to explore this dimension in greater depth.

Guided by the Disaster Resilience Framework and Community-Based Disaster Risk Reduction principles, this study quantitatively tests the individual predictive influence of three key factors on tourism resilience in Batangas, Region IV-A. Specifically, the study examines whether post-disaster recovery strategies, community involvement, and sustainable practices significantly explain variations in tourism resilience at the 0.05 level of significance. The findings demonstrate that all three factors have statistically significant effects on tourism resilience ($p = .000$). Post-disaster recovery strategies exhibit the strongest explanatory power ($R^2 = .520$), accounting for 52% of the variance in tourism resilience. Sustainable practices follow closely ($R^2 = .505$), explaining 50.5% of the variance, while community involvement also shows a substantial contribution ($R^2 = .456$), accounting for 45.6% of the variance. In each case, the null hypothesis is rejected, confirming that these variables significantly influence tourism resilience in the study area.

In summary, this study provides empirical evidence that post-disaster recovery strategies, sustainable practices, and community involvement each significantly predict tourism resilience in Batangas, Region IV-A. By statistically validating these relationships, the research strengthens theoretical applications of resilience frameworks and offers evidence-based guidance for disaster recovery planning and tourism policy development in disaster-prone destinations.

Theoretical Framework

This research is grounded in Holling's classic resilience theory (1973), a concept that has been applied to tourism systems by Cochrane (2010). Holling initially defined resilience as "the ability of ecosystems to absorb changes of state variables, driving variables, and parameters, and persist" (1973). This theory posits that a system's resilience is not just its capacity to withstand shocks but also its ability to adapt and transform over time. The concept has become a central focus in disaster risk reduction, informing discussions on how societies, communities, and various systems respond, recover, and evolve after crises (Miller et al., 2010). In this context, Holling's resilience theory states the ability of the ecosystem to absorb changes and still function. A natural disaster that we cannot predict (earthquake, flood, volcanic eruption, etc.)—in Holling's theory, communities and tourism destinations can still function after a catastrophic event that happened. Community involvement strengthens the recovery efforts—involving communities in the decision-making process, planning, preserving the ecosystem, providing their own needs, and implementation leads to stronger communities and long-term resilience because they are adjusting and reorganizing and it is still going without breaking down.

Holling's Classic Resilience Theory (1973) focuses on the core function of resilience, which is to recover, adapt, and transform—which can be applied to communities, tourism destinations and post-disaster recovery. It shows how a community can bounce back to their normal life after facing disturbances. It highlights the importance of detailed plans and readiness, creating systems that can change and recover from major threats like natural disasters and climate change. It is not just about survival; it is about learning from adversity to build a foundation for long-term success and development. This is especially pertinent to the human, societal, and systemic response to events like typhoons, earthquakes, floods, and volcanic eruptions that have impacted Batangas, Philippines. The study uses this theory as its foundation because it explains the remarkable resilience of Batangas City, which has consistently adapted, recovered, and transformed in the face of natural disasters.

This study uses Holling's theory to explain how the systems in Batangas City have undergone linked cycles of progress, downfall, and restoration. Batangas resilience is non-linear because Batangas is still in the process of bouncing back from all of the natural disasters that happened in their area. Batangas is experiencing a series of disasters, like a volcanic eruption, and after that progress on bouncing back, there will be an earthquake; after the earthquake, there will be a typhoon. It supports the "progress, downfall, and restoration" of Batangas because Batangas has a repetition cycle of resilience. The Taal Volcano in Batangas City erupted in the year 2020; people in Talisay, Batangas, are still gradually recovering from that trauma caused by the disaster, and after 4 years, they experienced a new natural disaster (typhoon) that buried everything and after the recovery of the people from the eruption that happened, the typhoon occurred that destroyed what they started after the eruption.

The theory also acknowledges the complex dynamics within a system. Tourism contains both benefits, like job creation, and vulnerabilities, such as depletion and cultural decline (Nkemngu, 2015; Zaei & Zaei, 2013). Because it contains both benefits and vulnerabilities, resilience theory helps explain how communities adapt when tourism pressures intensify, guaranteeing that undesirable consequences are controlled while the entire system continues to operate.

Ultimately, this study uses Holling's theory to explain how the systems in Batangas City have undergone linked cycles of progress, downfall, and restoration. It emphasizes that resilience is not simply about returning to the pre-disaster state but about the capacity for transformation and adaptation in response to change, which is central to the province's successful tourism regeneration. Holling's framework guides the hypothesis by anticipating that the tourism communities will adapt, recover, and transform after the disturbances. The results on the hypotheses show that Holling's theory links to post-disaster recovery, community involvement, and sustainable practices.

Conceptual Framework

Drawing upon Holling's Theory of Resilience, this study utilizes a conceptual framework to explain the interconnected relationship between post-disaster recovery (H1), community involvement (H2), and sustainable practices (H3) in achieving tourism resilience. Holling's adaptive cycle theory is foundational to this framework, depicting how systems endure disturbances through phases of release, reorganization, adaptation, and renewal. Specifically, post-disaster recovery reflects reorganization by rehabilitating infrastructure and response systems post-crisis, community involvement embodies adaptation through local participation in rebuilding, and sustainable practices promote renewal through economic viability and environmental quality for long-term viability.

Post-disaster recovery strategies initiate the reorganization phase by restoring infrastructure, revitalizing economies, and addressing

psychosocial needs, directly supporting tourism resilience through rapid adaptation (Holling, 1973).

Community involvement strengthens this process by promoting shared decision-making, equitable distribution of resources, and enhancing social cohesion, in which collectively facilitate recovery, align plans with local needs, and build adaptive capacity for future disturbances (Cruz, 2019). According to Tuhkanen (2023), community participation is essential and widely recognized as a key factor in achieving sustainable disaster recovery as it enables affected communities to actively engage in the planning, implementation, and monitoring of recovery initiatives.

Sustainable practices are equally important. It enhances long-term resilience by integrating eco-friendly infrastructure and preventive measures, ensuring resource efficiency, environmental conservation, and economic viability to sustain the conservation phase (Holling, 1973). These efforts mitigate the risks while optimizing resources for enduring adaptability.

The synthesis of these interconnected variables leads to tourism resilience. This enables destinations to not only recover from disasters but also to thrive when confronted with future challenges. This resilience fosters long-term sustainability, local empowerment, and an industry that is better equipped to withstand and rebound from crises. Together, these constructs enable tourism systems to endure disturbances, reorganize effectively, and adapt for sustained rebirth, as visualized in the conceptual model.

Figure 1 illustrates the directional interrelationships among the independent variables (post-disaster recovery, community involvement, sustainable practices) and the dependent variable (tourism resilience), reflecting Holling's adaptive cycle principles.

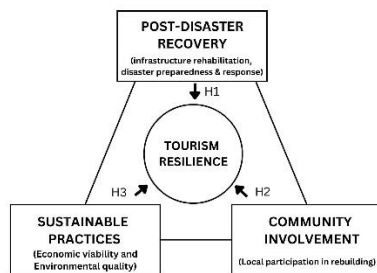


Figure 1. Conceptual Framework

Statement of the Problem

The tourism industry in Batangas faces persistent vulnerability to natural disasters, yet limited empirical evidence exists on how post-disaster recovery efforts, community involvement, and sustainable practices combine to enhance resilience and industry rebirth. Despite growing disaster recovery research, no studies have quantitatively examined their joint predictive effects on tourism destinations' rebound capacity in this context. This study addresses that gap through descriptive profiles and inferential analysis of their impacts.

Specifically, the study seeks to answer the following research questions, which include both descriptive components (profile of variables) and inferential components (impact analysis) to align with the methods approach:

1. What post-disaster recovery strategies have been implemented to support the tourism industry in Batangas?
2. What is the extent of local community involvement in the planning and decision-making processes for post-disaster tourism recovery efforts?

3. What is the extent of adoption of sustainable practices in post-disaster recovery efforts in Batangas, specifically in terms of:
 - a. Economic Viability?
 - b. Environmental Quality?

To determine the influence of these factors on tourism resilience, the study also seeks to answer:

1. Do post-disaster recovery strategies have a significant impact on tourism resilience in Batangas?
2. Does community involvement have a significant impact on tourism resilience in Batangas?
3. Do sustainable practices have a significant impact on tourism resilience in Batangas?
4. Based on the findings, what actionable insights can be recommended to strengthen resilience and promote the rebirth of the tourism industry in Batangas?

Collectively, these questions assess both the current conditions of the key variables and their predictive effects on tourism resilience.

Literature Review

Resilience

This series of natural disasters serves as a constant reminder that climate change has become a pressing challenge for humanity, and that addressing the risks posed by climate change should be a shared responsibility for all of us (Sim et al., 2018). Infrastructure and the livelihoods of people affected are seriously damaged by floods. In Tanzania floods are one the frequent calamities, typically brought on by severe rainfall and causing catastrophic harm to houses, farms, and infrastructure. In resilience it is developed through the process of linking organisational resources and capabilities to restore organizations' efficacy and support their competencies for further growth (Burnard & Bhamra, 2011, as cited in Sarker et al., 2020). It means "bounce back" and focuses on a process of bouncing back to the previous condition after facing any disturbance caused by hazards. The ability to grow and adapt to changes in order to become stronger is always possible after a calamity, resilience can help communities effectively utilise the scarce resources available at their disposal in implementing disaster mitigation measures that make their communities less vulnerable and more resilient. By ensuring that all voices and needs of the community are heard and addressed, it strengthens the ability to recover and face future calamities.

This highlights the adaptability and flexibility in responding to natural disasters. According to Steffen et al. (2018, the Earth is shifting into a "Hothouse Earth" from the Holocene climate, when the Earth was in a stable state and accessible to humans to grow. The concept of "Hothouse Earth" connects to the shifting of climate change from stable to unstable in Batangas Tourism. The extreme disruptions caused by climate change brought natural disasters that were felt in Batangas.

Post-disaster Recovery

Post-disaster recovery is a multifaceted process aimed at restoring and improving livelihoods, public health, economic stability, physical infrastructure, social systems, cultural heritage, and environmental resources in communities affected by disasters (Bannon & Irving, 2020). Beyond immediate response, recovery emphasizes long-term redevelopment through the "build back better" principle, which promotes stronger, safer, and more resilient infrastructure while encouraging learning-based adaptation (Dube, 2020). For tourism destinations, this approach is particularly important because infrastructure quality, accessibility, and safety directly influence tourist confidence and destination competitiveness.

From an infrastructure and economic standpoint, recovery requires strategic planning that integrates risk reduction with sustainable development (Zhang & Sarker, 2024). Damage to transportation systems, utilities, and communication networks can significantly disrupt tourism flows, affecting hotels, attractions, and related services. In rural areas, where tourism often depends on natural and cultural assets, limited financial and technical resources pose additional rehabilitation challenges (Jerolleman, 2020). Thus, infrastructure restoration is not only a physical process but also a key phase in reactivating tourism activities and restoring local income sources.

In addition to physical reconstruction, social and community recovery plays a vital role. Rebuilding social networks and community relationships strengthens local support systems that enhance collective resilience and adaptive capacity (Bakic & Ajdukovic, 2021). For tourism destinations, strong community cohesion supports local tourism operators, preserves cultural identity, and strengthens collaboration in recovery initiatives. Community empowerment and stakeholder participation are therefore essential components of disaster risk reduction in tourism, as local residents possess valuable contextual knowledge about environmental risks and destination vulnerabilities (Nurjanah et al., 2024). Effective disaster communication systems further reinforce sustainable tourism development in hazard prone areas.

From an economic perspective, micro, small, and medium-sized enterprises (MSMEs) are central to tourism recovery. Many tourism related businesses such as accommodations, restaurants, tour services, and souvenir shops fall within the MSME sector. Strengthening business continuity planning, financial preparedness, and access to external assistance significantly improves their recovery capacity and supports broader local economic revitalization (Aparecio & Torrejas, 2024). Similarly, efficient supply chain management ensures the availability of goods and services necessary for tourism operations, while coordinated governance structures facilitate resource allocation and timely rehabilitation (Moroney et al., 2020). Improved governance, communication, and inter-agency coordination enable communities to rebuild more sustainably and advance recovery efforts (Rouhanizadeh et al., 2020).

Together, these studies demonstrate that effective post-disaster recovery requires integrated coordination across infrastructure rehabilitation, community engagement, economic revitalization, and governance mechanisms. Rather than functioning independently, these elements interact to determine how efficiently and sustainably tourism destinations can recover stability and competitiveness.

Specifically for tourism development, recovery can be understood as a three-phase process that includes assessment, collaboration, and implementation (Alcoriza & Policarpio, 2023). The assessment phase involves evaluating the extent of damage to tourism assets, infrastructure, and community resources. The collaboration phase emphasizes partnerships among government agencies, private sector stakeholders, local communities, and tourism organizations to design responsive recovery strategies. Finally, the implementation phase focuses on executing rehabilitation plans, restoring tourism services, marketing the destination, and strengthening resilience measures to reduce future risks. The effectiveness of these phases is influenced by factors such as the scale of damage, financial capacity, governance quality, private sector participation, and public awareness (Moshakova, 2021).

In the Philippine context, where destinations are frequently exposed to natural hazards such as typhoons and volcanic eruptions, structured and tourism sensitive recovery planning is essential to recover visitor confidence and protect local livelihoods. Overall, the reviewed literature justifies the integration of post-disaster recovery as a critical variable in

tourism resilience studies, as it directly shapes the speed, sustainability, and long-term stability of tourism destinations. This conceptual grounding also provides a basis for examining how recovery strategies contribute to strengthened community involvement and enhanced tourism resilience in the succeeding sections of the study.

Community Involvement

Community involvement is widely recognized as a key factor in sustainable post disaster recovery and long-term resilience. When policymakers empower citizens and actively include them in planning and decision making, recovery initiatives become more responsive, inclusive, and aligned with local needs (Tuchi and Mutter, 2020; Ngulube, 2024). Affected communities are now viewed as active partners that contribute their own knowledge, objectives, and solutions to catastrophe recovery efforts, rather than as passive victims. Collectively, existing studies show that community involvement strengthens recovery outcomes by improving trust, enhancing social cohesion, and increasing the relevance of implemented programs (Islam et al., 2020; Harahap, 2020; Tuhkanen, 2023).

Community participation and empowerment are essential to this process. When residents are trusted and given meaningful roles in decision making, cooperation and collective capacity increase, leading to more effective recovery (Aldrich and Meyer, 2015; Li and Tan, 2019). A bottom-up approach further strengthens local leadership and reduces dependency on external assistance (Pandey, 2018). In tourism destinations, this form of participation supports the reopening of tourism enterprises, restoration of attractions, and rebuilding of destination image in ways that reflect local conditions and priorities.

Beyond participation, stakeholder engagement also plays an important role in recovery. Effective coordination among local communities, government agencies, private sector actors, and civil society improves transparency and accountability while ensuring that programs respond to actual needs (Marsh et al., 2017; Hamideh, 2020; Van Onselen et al. 2025). Capacity building initiatives that enhance leadership, communication, and collaborative planning further contribute to sustainable recovery (Crow and Albright, 2021). In the context of tourism, coordinated stakeholder efforts are essential for restoring operations, ensuring visitor safety, and managing environmental and cultural resources during the recovery phase.

Moreover, Cultural and social structures further shape how communities engage in recovery. Socio cultural factors influence how people organize, share information, and participate in rebuilding efforts (Rahmani et al., 2022; Abid et al., 2025; Senimoli et al., 2020). Shared values and strong social networks enhance cooperation and collective action, which improve recovery outcomes (Sobhaninia, 2023; Kaniasty, 2019). Practices such as mutual cooperation traditions like *gotong royong* demonstrate how cultural norms can support collective rebuilding (Koopman, 2021). Similar cooperative traditions are present in many Philippine communities and contribute to local rebuilding efforts and tourism related activities. In this study, socio-cultural factors provide theoretical context for understanding community dynamics but are not included as measured variables.

In addition to formal participation and governance structures, collective community action supports both physical recovery and social well-being (Saul, 2021b; Kaniasty, 2019). Community cooperation may also encourage volunteer initiatives and voluntourism, where volunteers assist in rehabilitation efforts while engaging with host communities (Wearing et al., 2020). When aligned with local priorities, these efforts can contribute to tourism recovery by supporting site rehabilitation and small tourism enterprises.

Overall, the study indicates that community involvement plays a significant role in post-disaster recovery expressed through participation, empowerment, stakeholder coordination, and collective action. It strengthens trust, aligns recovery strategies with community needs, and enhances local capacity. In tourism destinations, active community engagement contributes to business recovery, restoration of attractions, and long-term tourism resilience. Socio cultural factors provide contextual support for understanding these processes, reinforcing the role of community involvement in tourism recovery.

Sustainable Practices

Sustainable development refers to the actions and strategies that seek to address current needs without compromising the ability of subsequent generations in meeting and providing their own needs. These practices include environmental governance, social responsibility, and economic viability to ensure long-term sustainability (Brundtland Commission, 1987, as cited in Hajian & Jangchi, 2021). Moreover, it aligns with Holling's adaptive cycle by reducing vulnerability during exploitation or conservation phases, stabilizing systems amid crisis-induced release, and enabling renewal rather than mere restoration (Holling, 1973). In tourism, sustainability is reflected in practical and visible initiatives such as eco-friendly infrastructure (e.g., solar-powered resorts), effective waste management systems, energy-efficient hotels, community-based ecotourism initiatives, and climate-adaptive planning (UNWTO, 2018). Studies in the Philippines further demonstrate how these strategies are applied locally. In Batangas, for instance, the post-eruption recovery plans for Calatagan placed strong emphasis on mangrove protection and building a more resilient coastal tourism sector (Gonzales, 2025). Similarly, in Lipa, Batangas, highlights how strong community participation, well-maintained infrastructure and services, and consistent support from both the local government and non-government organizations (NGOs) can significantly strengthen a community's capacity for disaster preparedness and resilience (Fronza et al., 2025).

Collectively, sustainable practices helps transform short-term recovery efforts into long-term adaptive capacity. By balancing environmental protection (such as resource conservation and pollution reduction), economic stability (including viable growth and job creation), and social benefits (like improved community health through cleaner air and water) (GSTC, 2021), it fosters resilient systems that are better equipped to withstand and recover from shocks.

Economic Viability. Economic viability refers to the efficient utilization of resources to promote economic growth and development. It emphasizes preserving natural resources and establishing systems that generate employment, foster innovation, and minimize environmental harm (Kumar et al., 2024). In disaster-prone destinations such as Batangas, economic viability helps local economies recover through diversified income streams, reducing dependence on seasonal tourism fluctuations.

In the context of post-disaster tourism recovery, restoring economic viability becomes a primary objective. This involves rebuilding resilient infrastructure such as hotels and transportation networks while revitalizing small and medium enterprises (SMEs) in lodging, dining, tour operations, and guiding services, which are vital to community livelihoods (Liu et al., 2024). Moreover, promoting economic diversification further reduces dependence on a single industry, helping destinations avoid collapse and attract reinvestment and returning visitors during recovery. Its key mechanisms include disaster risk financing to enable rapid SME recovery and policies designed to broaden local income streams. However, in the Philippine setting, persistent budget constraints and bureaucratic delays within local governments often hinder tourism

reconstruction efforts, slowing the revival of the hospitality sector (Villacin, 2017; DOT, 2023).

While rebuilding efforts are essential, the manner in which recovery is pursued also matters. Mushtaha (2024) warns that hasty recovery often triggers overbuilding of resorts and neglect of green spaces, eroding the scenic appeal essential for tourism competitiveness. Although short-term strategies may briefly stimulate economic activity, they can damage the scenic and environmental qualities that sustain tourism competitiveness. As environmental quality declines particularly in nature-based destinations the long-term adaptive capacity is reduced. Additionally, integrating economic viability with environmental stewardship prevents these risks, ensuring development protects destination appeal. Sustainable planning safeguards ecological assets while supporting economic resilience, highlighting environmental quality as essential to recovery.

Collectively, these studies show that strengthening local enterprises, improving financial preparedness, and integrating environmental safeguards are all essential for long-term tourism sustainability in disaster-prone regions.

Environmental Quality. Environmental quality encompasses clean air and water, abundant green spaces, and the absence of harmful pollutants both preventing environmental degradation and providing ecological assets that support human and ecosystem health (Ghanem, 2018; Rasool et al., 2024). Taken together, these definitions emphasize its dual role eliminating environmental threats while cultivating restorative elements like vegetation that strengthen resilience against environmental stressors. In tourism, environmental quality directly drives competitiveness. Pristine landscapes, unpolluted water bodies, and scenic vistas generate visitor satisfaction and destination appeal, whereas degradation deters travel and erodes market share (Wang et al., 2020; Trang et al., 2019). Clean environments sustain hospitality operations and accelerate post-disaster visitor confidence.

In disaster-prone destinations like Batangas, environmental recovery deploys green infrastructure, mangroves for coastal protection, watershed restoration for water purification as natural buffers that rehabilitate tourism assets (Baloch et al., 2022). Taal eruption recovery demonstrates how air and water quality restoration rebuilt visitor trust and operational capacity. Beyond ecological gains, environmental rehabilitation delivers social benefits such as cleaner air improves community health, green spaces enhance well-being, and pollution controls preserve biodiversity vital for ecotourism (Emmanuel et al., 2024). These improvements create reinforcing cycles where healthier ecosystems sustain both residents and tourism economies.

Environmental quality is a key ecological foundation for tourism resilience, helping maintain destination appeal and operational viability during and after disasters both essential for attracting returning visitors and supporting economic recovery. As part of sustainable practices, it complements economic viability by protecting the natural assets that drive tourism competitiveness and enabling ecosystem-based adaptation in line with renewal phase. In this study, environmental quality (H3b) is treated as a critical predictor variable, measuring its direct impact on tourism resilience in Batangas and linking theoretical resilience concepts with empirical indicators such as air, water, and landscape restoration.

Hypotheses development

Tourism Resilience. Resilience is defined as adapting to a situation to overcome challenges. Climate change is having a negative impact on individuals. Heavy rainfalls greatly affect the livelihoods, agriculture, and homes of residents, causing widespread damage to the environment

(United Nations Office for Disaster Risk Reduction, 2019). Natural disasters in recent years serve as warning signs of climate change, and it should be considered a worldwide responsibility to address climate-related risks (Sim et al., 2018). Resilience is described as the ability to “bounce back” by connecting the resources and capabilities to restore its efficacy. Despite encountering environmental challenges, resilience will successfully bounce back and regain its effectiveness (Burnard & Bhamra, 2011, as cited in Sarker et al., 2020). Resilience adapts to how to measure all the limited resources to all the communities that were affected by the disaster by allocating an equal distribution of resources (Almutairi et al., 2020). In community resilience, individuals affected by disasters can sustain, recover, and adjust their communication. Suppose each individual communicates effectively during tough times. In that case, people will be able to share important information, stay connected, and stay updated, which enables the community to work together efficiently (Rachmad, 2022).

Post-disaster Recovery. This section presents the hypotheses derived from the reviewed literature and aligned with the study’s conceptual framework. Based on previous findings, post-disaster recovery is expected to influence tourism resilience. The following discussion explains the theoretical and empirical basis for this relationship and clarifies why post-disaster recovery is hypothesized to significantly affect tourism resilience. Post-disaster recovery refers to structured efforts aimed at restoring infrastructure, livelihoods, governance systems, and social structures following a disaster. Central to this process is the “build back better” principle, which promotes safer, stronger, and more inclusive reconstruction to reduce future risks (Bannon & Irving, 2020). In tourism destinations, infrastructure quality, accessibility, and safety directly influence visitor confidence and operational continuity. Thus, recovery strategies that integrate sustainability and risk reduction contribute not only to physical rebuilding but also to strengthening tourism systems. Moreover, recovery approaches that emphasize building back faster and more inclusively help minimize prolonged disruptions in tourism activities (Dube, 2020). Rapid yet strategic reconstruction supports the timely reopening of tourism facilities, transportation networks, and supporting services. Inclusive recovery ensures that all affected stakeholders including local tourism operators and vulnerable groups are supported, thus enhancing adaptive capacity within the tourism sector. Community resource development further strengthens resilience by improving collective well-being and social support systems (Bakic & Ajdukovic, 2021). In tourism-dependent communities, strong social networks facilitate coordinated recovery efforts and sustain destination image and service quality. Additionally, incorporating intelligence and monitoring mechanisms in recovery planning enhances the ability of destinations to adapt to evolving risks and changing environmental conditions (McClelland et al., 2021). Effective monitoring and evaluation systems ensure that reconstructed structures and tourism facilities meet sustainability and resilience standards over time (Serter & Gumusburun, 2024). Collectively, these studies indicate that post-disaster recovery enhances adaptive capacity, supports system restoration, and strengthens long-term transformation within tourism destinations. As tourism resilience reflects a destination’s ability to recover, adapt, and sustain operations after disruptions, it is theoretically and empirically reasonable to expect that effective post-disaster recovery positively influences tourism resilience.

Ho1. Post-disaster recovery has a significant impact on tourism resilience

Community Involvement. Community involvement is a key factor in strengthening tourism resilience, which refers to the ability of a destination to recover from disasters, adapt to change, and sustain tourism activities. Active community participation improves decision making and ensures that recovery strategies reflect local needs and priorities (Iuchi and Mutter, 2020; Ngulube, 2024). When communities

are empowered through a bottom-up approach, they are better able to rebuild and maintain tourism facilities, protect tourism assets, and accelerate the reopening of tourism sites (Pandey, 2018; Ngulube et al., 2023). This empowerment enhances the adaptive capacity of the destination.

Stakeholder engagement also supports tourism resilience. Collaboration among local communities, government, and tourism stakeholders improves coordination, strengthens governance, and promotes destination safety and preparedness (Hamideh, 2020; Van Onselen et al., 2025). Such collaboration allows tourism recovery to be more organized and effective.

Social cohesion further contributes to resilience. Strong community relationships encourage collective action, trust, and mutual support during rebuilding processes (Saul, 2021b; Kaniasty, 2019). Coordinated efforts contribute to the restoration of tourism services and the maintenance of local tourism.

Lastly, community driven initiatives such as voluntourism can also help in rehabilitation efforts (Wearing et al., 2020). When aligned with local priorities, these initiatives support small tourism enterprises and strengthen community ownership of recovery programs.

Given that community involvement enhances adaptive capacity, improves coordination, strengthens social cohesion, and supports tourism recovery efforts, it is reasonable to expect that community involvement significantly contributes to tourism resilience.

Ho2. Community involvement has a significant impact on tourism resilience

Sustainable Practices. Sustainable tourism destinations gain a competitive advantage through traveler recognition and loyalty, as sustainability signals long-term viability (Espiner et al., 2017). Holladay’s (2018) integrated model combines Butler’s (1980) destination life cycle with Holling’s (1986) adaptive cycle, framing sustainable practices as resilience strategies applicable across all destination phases especially during crisis-induced reorganization and renewal. Sustainable practices enhance tourism resilience in multiple ways. Resource-efficient infrastructure withstands shocks and reduces recovery costs, ecosystem preservation maintains visitor appeal after disasters, and adaptive management transforms vulnerabilities into opportunities (Folke et al., 2010; Marchese et al., 2018). Collectively, these practices protect natural and cultural assets while mitigating economic losses and social disruptions (UNWTO, 2018). In disaster contexts, sustainable practices accelerate tourism recovery by preserving the environmental conditions necessary for operations. Intact landscapes sustain scenic attractiveness for returning visitors, resilient green infrastructure allows rapid site reopening, and diversified economic activities reduce dependence on sectors affected by damage. Local communities also benefit through sustained livelihoods in eco-tourism and conservation-related employment. Given this evidence, sustainable practices clearly enhance adaptive capacity, preserve destination competitiveness, and support transformation beyond mere restoration. Accordingly, H₃ states: Sustainable practices have a significant positive impact on tourism resilience in Batangas. With sustainable practices established as predictor H₃, the framework now turns to community involvement (H₂) and its complementary role in social adaptation and coordinated recovery efforts.

Ho3. Sustainable practices have a significant impact on tourism resilience

METHODOLOGY

Research Design

This study utilized a quantitative descriptive-correlational research design. This approach suited the objectives by quantifying the profiles of post-disaster recovery, community involvement, and sustainable practices while testing their significant relationships with tourism resilience through regression analysis (Creswell, 2017). Unlike a purely descriptive design, it measured variable associations and generated statistical evidence to answer both descriptive (RQ1–3) and inferential (RQ4–6) questions. This design focused on answering the research questions rather than exploring causal relationships. The method involved collecting quantitative data in a numerical format, which enabled the researchers to describe the characteristics of the population and the phenomena under investigation—specifically, "what, where, and when" the events happened (Ghanad, 2023). This design allowed the study to quantify the relationships between the independent variables and tourism resilience.

Research Locale

The study was conducted in Talisay, Batangas, Philippines. Batangas is a well-known tourist destination renowned for its natural beauty and accessibility to Metro Manila (Vizconde & Felicen, 2012; Ylagan & Laguador, 2014). Talisay was chosen as the specific locale because it was one of the municipalities most severely affected by recent natural disasters. As a community situated near Taal Lake, a critical tourism area, its experiences and recovery strategies provided valuable insights that can serve as adaptable models for other municipalities and inform provincial-level disaster recovery policies. Figure 1 presents the map of Batangas.



Figure 2. Map of Batangas

Respondents of the Study

The respondents for this study were residents of Talisay, Batangas. According to data from the Philippine Statistics Authority (2021), 46,238 people were living in the municipality as of the 2020 Census of Population and Housing. The Raosoft sample size calculator was used to determine the sample size, which provided a minimum of 381 respondents with a 50% response distribution, a 95% confidence level, and a 5% margin of error. A 95% confidence level and a 5% margin of error were selected because these parameters provide adequate statistical precision and are commonly used standards in social science research. A 50% response distribution was applied as it is the conventional assumption when the actual population proportion is unknown, ensuring a more conservative and reliable sample size estimation.

Purposive sampling was used in this study to ensure that participants met specific inclusion criteria relevant to the research objectives. This sampling method was appropriate because the study required respondents who had sufficient experience with local natural disasters

and tourism conditions. To ensure the relevance and quality of the data collected, participants were screened based on age, length of residency, and language proficiency.

Participants were required to be at least eighteen years old. Adults were selected because their cognitive maturity and life experience enable them to provide informed and reflective responses to the survey questions (Khawar et al., 2013; Salthouse et al., 2003). The inclusion of middle aged and older individuals further strengthened the quality of insights, as they tend to have stronger community ties and greater awareness of disaster recovery processes and changes in local tourism conditions (Gowan et al., 2014; Liao and Hu, 2023).

The respondents must have been residing in Talisay, Batangas for at least 5 to 10 years. This ensured that the respondents were able to be directly exposed to the impacts of natural disasters in the area, such as the eruption of Taal Volcano and the impacts of the recent typhoons that hit the area. A minimum of several years of residency increased the likelihood that respondents had observed both disaster impacts and recovery efforts affecting tourism and community conditions. Respondents were also required to be conversant in English and Filipino to ensure clear understanding of the survey questions and accurate responses.

Excluded from the study were non-residents, tourists, individuals below 18 years old, and residents who had lived in Talisay for less than five years. These criteria ensured that participants had adequate exposure to disaster impacts and local tourism conditions, thereby providing reliable data for assessing tourism resilience and recovery.

Instrumentation

The primary data collection instrument was a structured questionnaire designed to evaluate residents' perspectives on post-disaster recovery factors in Talisay. It consisted of two main parts. The first part collected the demographic profile of the respondents. The second part consisted of survey questions measuring the four main variables—post-disaster recovery, community involvement, sustainable practices, and tourism resilience—using 10 items per variable (40 items total). The sample statements include "The rebuilding efforts have been well-coordinated and efficient" and "Involving the community in decision-making helps to speed up the tourism recovery process". A 5-point Likert scale was used to measure the respondents' level of agreement with statements for post-disaster recovery and tourism resilience (1 = Strong Disagree; 5 = strongly agree), and a 5-point effectiveness scale for community involvement and sustainable practices (1 = not effective; 5 = highly effective). A researcher-developed instrument tailored to the objectives of the study. To test the instrument's reliability, the validation process underwent content and face validity. The instrument underwent pilot testing to evaluate its reliability. Internal consistency was measured using Cronbach's Alpha. The pilot test included the 30 respondents from Talisay residents which yielded Cronbach's $\alpha = 0.966$, indicating a very high level of internal consistency among the survey items.

Data Collection

The researchers collected data through face-to-face surveys to facilitate direct interaction with respondents and ensure clear communication. A researcher-developed instrument, designed to the objectives of the study, was used. The questionnaire comprised 40 items distributed across four variables, each measured using a 5-point Likert scale. Ethical considerations, including informed consent and confidentiality, were strictly observed throughout the process to protect respondents' rights and maintain data integrity. Demographic information was recorded to provide contextual insights into the respondents. Frequencies and percentages were calculated for variables such as age, gender, educational attainment, and length of residency. The age distribution indicated a

balanced representation across different age groups, while educational levels and years of residency reflected a mix of experiences within the community. Overall, the sample consisted of long-term residents with varied ages and educational backgrounds, providing diverse perspectives on post-disaster tourism resilience in Talisay, Batangas.

Data Analysis

The data collected from the survey were analyzed using both descriptive and inferential statistical methods. Descriptive statistics were employed to summarize and describe the characteristics of the variables, providing a clear overview of the data. To examine the significant relationships among variables, inferential statistics were applied. Prior to regression analysis, the assumptions of normality and linearity were tested to ensure the appropriateness of the method. A multiple linear regression model was used to test the influence of the independent variables (post-disaster strategies, community involvement, and sustainable practices) on the dependent variable (tourism resilience). This approach allowed for simultaneous assessment of all predictors in the method.

Ethical Considerations and Data Protection Plan

The researchers were committed to upholding the highest ethical standards throughout this study, ensuring the respectful and responsible treatment of all participants. Participation in the study was completely voluntary. All participants were provided with a consent form that clearly outlined the study's purpose, procedures, and their right to withdraw at any time without negative consequences. The privacy of all participants was protected. The data collected did not include personally identifiable information unless explicitly requested and consented to in the signed informed consent form. The researchers prioritized the anonymity and confidentiality of all respondents. The researchers ensured the study's reliability and credibility by thoroughly and transparently examining all data, methods, and findings to maintain academic integrity.

In compliance with Republic Act No. 10173, also known as the Data Privacy Act of 2012, this plan outlined the measures that were taken to ensure the confidentiality, security, and proper handling of all collected data. Data were collected through face-to-face surveys. The researchers manually encoded responses. Participants were fully informed about the study's purpose and procedures before participation. All collected data was stored securely and treated with strict confidentiality. Hard copies of the completed survey forms were kept safely and locked, accessible only to members of the research team. Access to the raw data was strictly limited to the research team. No unauthorized individuals had access to any raw data at any point during the research process. Data was retained for a maximum of three years after the study's completion. Following this period, all data, including hard copies, were securely discarded through shredding. In the event of a data breach (e.g., loss, theft, or unauthorized access to physical survey forms), the research team immediately assessed the situation and notified affected participants and appropriate data protection authorities. Urgent action was taken to secure the breach and prevent further access. Participants were informed of their rights as data subjects, including their right to be informed about the study, the handling of their data, and their right to withdraw from the study at any time without penalty.

RESULTS AND DISCUSSION

Respondent's Profile

Table 1 presents the demographic breakdown of the 381 respondents selected through purposive sampling.

Table 1. Profile of respondents

Demographic Variable	Category	Frequency	Percentage
Gender	Male	143	37.5%
	Female	238	62.47%
Age	18 to 26 years old	116	30.45%
	27 to 35 years old	76	19.95%
	35 years old and above	189	49.61%
Civil Status	Single	171	44.88%
	Married	179	46.98%
	Widowed	31	8.14%
Educational Attainment	Primary school	10	2.62%
	Secondary school	26	6.82%
	High School	198	51.97%
	College	147	38.58%
Number of years lived in Talisay, Batangas	5 to 15 years	74	19.42%
	16 to 25 years	121	31.76%
	26 to 35 years	67	17.58%
	36 years and above	119	31.23%
Total		381	100%

The findings show that the majority of respondents were female (62.47%), while male respondents comprised a smaller portion of the sample. This distribution indicates that women represent a significant segment of the surveyed community and may offer perspectives shaped by their roles within households and community activities. In terms of age, 49.61% of respondents were 35 years old and above. This suggests that a considerable portion of the sample consists of adults who may have accumulated life experiences related to disaster events and community recovery efforts. Regarding civil status, 46.98% of respondents were married. This reflects that many participants belong to family households, which may influence how they perceive disaster preparedness, recovery, and community support systems. For educational attainment, 51.97% of respondents had completed high school education. This indicates that most participants possess foundational educational backgrounds that may shape their understanding of disaster-related issues and tourism recovery initiatives. Lastly, in terms of residency, 31.76% of respondents had lived in Talisay, Batangas for 16–25 years. The presence of long-term residents in the sample suggests familiarity with the local environment, past disaster experiences, and community development patterns. Overall, the demographic profile shows that the sample is composed of predominantly female, middle-aged, married, and long-term residents with secondary-level education, providing varied perspectives on post-disaster tourism resilience in Talisay, Batangas.

Post-disaster recovery strategies were implemented to support the tourism industry in Batangas

Table 2 presents the perceptions of stakeholders regarding the effectiveness of recovery efforts following a disaster in Batangas.

The stakeholder perceptions of post-disaster recovery strategies implemented to support the tourism industry in Batangas yielded an overall weighted mean of 4.21 (SD = 0.76), indicating that the strategies were generally perceived as highly effective, which suggests strong institutional performance in managing recovery efforts. This aligns with the broader literature emphasizing the importance of coordinated governance and community engagement in disaster contexts (Ryan et al., 2020).

Key indicators such as emergency relief provision (Statement 4, M = 4.22), infrastructure restoration (Statement 6, M = 4.24), and

government-community communication (Statement 8, $M = 4.25$) received high ratings, reflecting timely and well-coordinated interventions. These findings support the strategic role of local authorities and inter-agency collaboration in facilitating recovery and enhancing institutional readiness (Sab et al., 2025; LPU-Batangas: PDRRMO, 2025).

Table 2. Post-disaster Recovery

Statement	Mean	SD	Interpretation
1. Assistance from local authorities was timely and adequate.	4.15	0.77	Effective
2. The recovery process has been well-managed by local authorities.	4.22	0.73	Highly Effective
3. The rebuilding efforts have been well-coordinated and efficient.	4.28	0.70	Highly Effective
4. Emergency relief was sufficient to meet the immediate needs of affected individuals.	4.22	0.72	Highly Effective
5. Infrastructure such as roads, bridges, and utilities was restored within approximately two to four weeks after the disruption.	3.91	0.94	Effective
6. Infrastructure such as roads, bridges, and utilities were restored within approximately two to four weeks after the disruption.	4.24	0.74	Highly Effective
7. Infrastructure such as roads, bridges, and utilities was restored within approximately two to four weeks after the disruption.	4.21	0.76	Highly Effective
8. There has been sufficient communication between the government and the community regarding recovery efforts.	4.25	0.76	Highly Effective
9. The post-disaster recovery process has helped to rebuild a stronger and more resilient community.	4.29	0.75	Highly Effective
10. The recovery efforts have led to improved disaster preparedness for future events.	4.34	0.71	Highly Effective
Weighted Mean	4.21	0.76	Highly Effective

Notably, the highest-rated item, which states that “The recovery efforts have led to improved disaster preparedness for future events” (Statement 10, $M = 4.34$), underscores the long-term impact of recovery initiatives on resilience-building. This suggests that, beyond immediate relief, the recovery process contributed to adaptive capacity and institutional learning within the tourism sector. Sab et al. (2025) emphasize the value of systems thinking and multi-hazard planning in tourism-dependent regions, advocating for integrated frameworks that promote both preparedness and sustainability.

However, two items received relatively lower scores: Statement 1 (“Assistance from local authorities was timely and adequate”, $M = 4.15$) and Statement 5 (“Infrastructure was restored within approximately two to four weeks”, $M = 3.91$). While both were still interpreted as “Effective,” the lower ratings suggest areas for improvement, particularly infrastructure restoration and timely assistance. Specifically, delays in infrastructure restoration may hinder overall recovery and affect community well-being. This concern is echoed by Hallegatte et al. (2019), who argue that infrastructure recovery is often the slowest component of post-disaster response due to procurement bottlenecks, contractor delays, and coordination challenges. Ranghieri (2014) similarly notes that infrastructure interdependencies can impede recovery, especially when administrative systems are fragmented.

The relatively low score for Statement 5 also supports Aparecio and Torrejas’ (2024) findings, which call for enhanced planning and resource allocation among MSMEs and local stakeholders. Their study highlights

the need for institutional control, preparedness, and external support to strengthen business resilience in post-disaster contexts.

Contrastingly, Medway et al. (2020) caution that improvements in disaster preparedness may be superficial unless formally institutionalized and regularly updated. They argue that many preparedness strategies remain unimplemented at the community level, limiting their practical impact. This highlights the importance of translating policy into action and ensuring that preparedness measures are integrated into local governance structures.

Level of local community involvement in the planning and decision-making processes

Table 3 shows the respondents' assessment of the level of local community involvement in the planning and decision-making processes for post-disaster tourism recovery efforts.

Table 3. Community Involvement

Statement	Mean	SD	Interpretation
1. Involving the community in decision-making helps to speed up the tourism recovery process.	4.37	0.70	Highly Effective
2. Giving residents an active role in restoring tourism makes recovery more successful.	4.38	0.68	Highly Effective
3. When calamity happens, working together as a community may help everyone overcome and rebuild their lives.	4.48	0.61	Highly Effective
4. Throughout the recovery period, tourism volunteers benefit both the tourism sector and the community.	4.36	0.66	Highly Effective
5. When communities take part in rebuilding, officials pay more attention to their needs.	4.32	0.77	Highly Effective
6. Engaging the community in tourism planning will result in a more sustainable recovery.	4.40	0.68	Highly Effective
7. Treating the community as partners in rebuilding, rather than victims, results in a more successful long-term tourist recovery.	4.37	0.73	Highly Effective
8. When residents work together, they build their bonds with one another and benefit the entire community.	4.45	0.70	Highly Effective
9. Government-community collaboration enhances disaster reconstruction and rebuilding of tourism.	4.38	0.67	Highly Effective
10. Tourism initiatives that include local people and focus on caring for nature are effective in protecting areas from disasters.	4.38	0.67	Highly Effective
Weighted Mean	4.39	0.69	Highly Effective

The overall weighted mean of 4.39 ($SD = 0.69$) in the table indicates that community participation was perceived as highly effective across all indicators. This highlights the crucial role of community engagement in promoting inclusive, resilient, and sustainable recovery outcomes.

Among the ten statements, the highest-rated item was Statement 3: “When calamity happens, working together as a community may help everyone overcome and rebuild their lives” ($M = 4.48$), emphasizing the importance of social cohesion and collective action. This finding aligns with Lin et al. (2021), who argue that social cohesion enhances community resilience by strengthening interpersonal bonds and enabling coordinated recovery efforts. It also reflects the broader principle that disaster recovery must be rooted in community solidarity and shared responsibility. While statement 6 (“Engaging the community in tourism

planning will result in a more sustainable recovery”, $M = 4.40$) further reinforces the value of local knowledge and participatory governance. According to Pyke et al. (2018), stakeholder engagement, especially in nature-based tourism destinations, enhances adaptive capacity and reduces vulnerability. This supports the idea that recovery planning should not only rebuild but also transform tourism systems toward sustainability.

In addition, statements 1, 2, 7, and 9, each scoring above 4.37, demonstrate strong support for inclusive decision-making, volunteerism, and government-community collaboration. These results align with those of Fatini and Herwangi (2022), who emphasize that community participation fosters stakeholder alignment and ensures that recovery efforts are context-sensitive and equitable.

On the other hand, statement 5 (“When communities take part in rebuilding, officials pay more attention to their needs”, $M = 4.32$) received the lowest rating, albeit still within the “Highly Effective” range. This suggests a perceived gap between community engagement and government responsiveness. Su and Dé (2020) found similar tensions in Tacloban post-Haiyan, where residents viewed recovery as a return to normalcy, while authorities promoted “building back better”—often without sufficient consultation. This disconnect points to the need for trust-building mechanisms and transparent feedback loops between communities and institutions.

Moreover, Sanderson et al. (2024) caution that while community-centered recovery is widely endorsed, it is rarely implemented effectively. Their study reveals that command-and-control approaches, short recovery timelines, and centralized decision-making often undermine genuine community involvement. Owen (2018) adds that disaster recovery is inherently complex, requiring governments to acknowledge limitations, engage diverse voices, and support vulnerable groups. These insights suggest that while community participation is critical, its impact depends on institutional willingness to share power and co-create solutions.

Adoption of sustainable practices in post-disaster recovery efforts in Batangas

Table 4 shows how sustainable practices have been adopted in Batangas' post-disaster recovery, specifically focusing on economic viability and environmental quality. The table indicates the overall weighted mean for both dimensions, highlighting the general impact of sustainable recovery practices in the community.

The table's overall weighted mean of 4.22 ($SD = 0.69$) indicates that sustainability-driven recovery efforts were perceived as highly effective, affirming their strategic value in enhancing resilience and long-term community well-being. However, environmental quality received the higher mean score of 4.31, interpreted as “Highly Effective,” as compared to the dimension of economic viability, which received a slightly lower mean score of 4.13, interpreted as “Effective.”

The finding generated by environmental quality suggests that respondents viewed environmental initiatives—such as proper waste disposal (Statement 6, $M = 4.45$), sustainable tourism (Statement 7, $M = 4.34$), and tree planting (Statement 8, $M = 4.20$)—as impactful components of recovery. These practices not only mitigated ecological risks but also promoted community-wide awareness and stewardship (Statement 9, $M = 4.31$). This aligns with Acuzar (2021), who emphasized that environmental interventions—particularly those rooted in community engagement—play a vital role in reducing vulnerability and enhancing adaptive capacity. Similarly, Mushtaha and Alaloul (2025) argue that sustainability frameworks must integrate environmental, social, and institutional dimensions to ensure holistic recovery outcomes.

Table 4. Sustainable Practices

Statement	Mean	SD	Interpretation
Economic Viability	4.13		Effective
1. There's financial assistance for the local residents after the disaster.	4.13	0.68	Effective
2. The adoption of sustainable practices has helped preserve the natural environment of Talisay, Batangas and long-term cost savings.	4.20	0.59	Highly Effective
3. The financial investment in reconstructing the infrastructure after the calamity was enough.	4.05	0.75	Effective
4. Livelihood training helped affected individuals regain jobs after the disaster.	4.12	0.66	Effective
5. The sustainable practices are economically viable in the long term.	4.15	0.66	Effective
Environmental Quality	4.31		Highly Effective
6. Proper disposal of waste has helped the community prevent pollution.	4.45	0.70	Highly Effective
7. After the disaster, sustainable tourism practices have helped to improve the quality of life for locals.	4.34	0.71	Highly Effective
8. The barangay has an initiative of tree planting to reduce air pollution, risk of flood and landslide as part of the recovery.	4.20	0.78	Highly Effective
9. Implementing sustainable recovery strategies has led to an environmental awareness to the local community.	4.31	0.65	Highly Effective
10. The local stakeholders of Batangas actively promote sustainable initiatives like the conservation of resources (e.g water, energy, waste reduction and recycling, etc).	4.25	0.69	Highly Effective
Weighted Mean	4.22	0.69	Highly Effective

On the other hand, the economic viability dimension was rated moderately low, especially the indicators such as financial assistance (Statement 1, $M = 4.13$), livelihood training (Statement 4, $M = 4.12$), and long-term viability of practices (Statement 5, $M = 4.15$), compared to environmental efforts. This implies that economic recovery remains a more fragile and complex component of post-disaster resilience. This disparity suggests that economic recovery, though progressing, faces challenges related to resource limitations, infrastructure investment (Statement 3, $M = 4.05$), and inclusive access. Rouhanizadeh et al. (2020) support this view, noting that post-disaster recovery often demands simultaneous restoration of services, infrastructure, and livelihoods—requiring substantial financial and logistical capacity. Yu et al. (2015) further emphasize that economic viability is a core metric of resilience, as it reflects the system's ability to rebound and sustain productivity.

The difference in interpretation indicates that most of the local community perceives environmental quality as more prominent in recovery efforts compared to economic viability. This preference stems from the tangible and visible impact environmental quality has on the destination, as it directly affects the foundational resources and resilience capacity upon which tourism and local communities rely for sustainable recovery (Estevão & Costa, 2020). In contrast, while economic viability remains crucial, it tends to be less visible and more abstract. Financial flows, business reconstruction, and job restoration are important components, yet these factors may not immediately enhance tourism appeal if the natural environment remains degraded. Furthermore, economic recovery often requires time-consuming processes such as financial transactions, policy reforms, and business adjustments that do not emit observable signs of progress (World Bank, 2020).

Despite the variation in scores, the overall interpretation remains “Highly Effective,” reinforcing the idea that sustainability is a foundational principle in post-disaster recovery. As Mushtaha and Alaloul (2025) suggest, integrating economic and environmental strategies fosters systemic resilience and reduces long-term vulnerabilities. However, Vivien (2023) cautions that overemphasis on one dimension—such as environmental quality—without equal attention to economic viability may result in imbalanced recovery outcomes. Sustainable recovery must therefore be multi-dimensional, ensuring that ecological preservation is matched by inclusive economic revitalization.

Post-recovery strategies have a significant impact on tourism resilience in Batangas

The regression results in Table 5 provide compelling empirical evidence that post-disaster recovery strategies have a significant influence on tourism resilience in Batangas. With an R-squared value of 0.520, the model explains 52% of the variance in tourism resilience, indicating a strong predictive relationship. The computed F-value of 20.25 and a p-value of .000 (significant at $\alpha = .05$) lead to the rejection of the null hypothesis, affirming that post-recovery strategies are not only relevant but statistically impactful.

Table 5. Post-disaster Strategies impacted Tourism Resilience

Variables	Post- recovery Strategies Tourism Resilience
R-squared	0.520
Computed	20.25
P-value	0.000
Decision	Reject Ho
Conclusion	Significant

An R^2 of 0.520 suggests that more than half of the changes in tourism resilience can be attributed to the effectiveness, scope, and implementation of post-disaster strategies. This level of explanatory power is substantial in social science research, where multifactorial influences are common. It implies that strategic recovery planning—such as infrastructure restoration, community engagement, and sustainable tourism practices—plays a central role in shaping a destination’s ability to withstand and rebound from disruptions.

This finding aligns with Foster’s (2012) definition of resilience as a region’s capacity to anticipate, respond to, and recover from disturbances. In the context of tourism, resilience is not merely about bouncing back—it involves transformative recovery, where systems are rebuilt stronger, more adaptive, and more inclusive (Ritchie, 2009). Similarly, OECD (2015) expands this view by framing resilience as the ability to absorb shocks while maintaining growth. In Batangas, post-recovery strategies, including livelihood restoration, environmental rehabilitation, and stakeholder coordination, contribute to achieving this dual goal: reducing vulnerability while promoting sustainable tourism development. The significance of post-recovery strategies is further supported by the multidimensional nature of tourism resilience, as outlined in the literature, including community-centered recovery, which was highlighted in earlier tables. Community involvement enhances social cohesion and local ownership of recovery efforts, which are critical for long-term resilience (Fatini & Herwangi, 2022; Lin et al., 2021). The environmental sustainability practices of waste management, tree planting, and eco-tourism initiatives not only restore ecological balance but also attract responsible tourism, reinforcing resilience (Mushtaha & Alaloul, 2025). Meanwhile, economic rehabilitation: Although economic viability was rated slightly lower, its integration into recovery strategies—through financial assistance and livelihood training—remains essential for

restoring tourism-dependent economies (Yu et al., 2015; Rouhanizadeh et al., 2020).

The Classic Resilience Theory by Holling (1973) aligns with the results in post-disaster recovery in tourism resilience in Batangas. Holling’s theory defined resilience as the ability of ecosystems to absorb changes. It describes resilience as the capacity to handle any disturbances and still continue to function. In table 5, this theoretical approach is empirically supported by the regression results, which indicate that post-recovery measures explain 52% of the variance in tourism resilience ($R^2 = 0.520$, $F = 20.25$, $p = .000$) states that post-disaster recovery strategies have a significant influence on tourism resilience in Batangas and it emphasizes that successfully recovery efforts help the tourism sector to adjust to changes and continue to operate even after experiencing disruptions. Also, the R-squared of “post-disaster recovery” is the highest among “community involvement” and “sustainable practices.” The results in post-disaster recovery show that 52% of the variance in tourism resilience is due to the successful recovery measures. It means that the post-disaster recovery explains more than half of Batangas’ tourism recovery, which comes from post-disaster recovery initiatives.

Community involvement has a significant impact on tourism resilience in Batangas

Table 6 shows the regression analysis, which reveals a statistically significant relationship between community involvement and tourism resilience in Batangas. With an R-squared value of 0.456, the model explains 45.6% of the variance in tourism resilience, and the p-value of .000 (significant at $\alpha = .05$) confirms the strength of this relationship. The null hypothesis is rejected, validating the assertion that community involvement plays a critical role in shaping tourism resilience.

Table 6. Community Involvement Impacted Tourism Resilience

Variables	Community Involvement Tourism Resilience
R-squared	0.456
Computed	17.84
P-value	0.000
Decision	Reject Ho
Conclusion	Significant

An R^2 of 0.456 indicates that nearly half of the changes in tourism resilience can be attributed to the degree of community involvement in post-disaster recovery. This is a substantial contribution, especially in complex systems like tourism, where multiple social, economic, and environmental factors influence resilience. The results suggest that engaged communities are not passive recipients of aid, but rather active agents in rebuilding and strengthening tourism systems. This finding aligns with Norris et al. (2008), who define community resilience as the ability of a community to leverage its resources, networks, and competencies to respond to and recover from adversity. In tourism contexts, this means that local participation in planning, decision-making, and implementation enhances adaptive capacity and fosters long-term sustainability. Moreover, Fatini and Herwangi (2022) emphasize that community involvement promotes stakeholder alignment, ensures that recovery efforts reflect local priorities, and builds trust among actors. Their study found that inclusive recovery processes lead to more resilient tourism destinations, especially in disaster-prone areas.

Lin et al. (2021) further argue that social cohesion and collective action are key drivers of resilience. When communities work together—through volunteerism, shared decision-making, and environmental stewardship—they not only rebuild infrastructure but also strengthen social capital, which is essential for enduring future shocks.

While the statistical result is strong, the literature also cautions against assuming that community involvement is always effective. Sanderson et al. (2024) note that top-down recovery models often limit genuine participation, and Owen (2018) argues that governments must be transparent about constraints and actively support diverse community voices. These insights suggest that community involvement must be meaningful, not symbolic, and supported by institutional frameworks that enable shared decision-making.

The findings that Batangas City tourism resilience is greatly impacted by community involvement align with Holling's (1973) theory of resilience, which defines resilience as a system's capacity to withstand shocks, adjust, and carry on in the face of difficulties. In Table 6, the result shows that R-squared has a value of 0.456, the model explains 45.6% of the variance in tourism resilience, and the p-value is .000. Table 5 results emphasize that community involvement has a significant impact on tourism resilience, where the results emphasized how the system's ability to adapt is strengthened by the involvement of the community. The tourism industry can absorb and adapt to the disruptions if they have a strong community involvement in planning, decision-making, and recovery efforts. Also, the community involvement has a lesser statistical impact compared to "post-disaster recovery" and "sustainable practices." Community involvement has an R-squared of 45.6%, but this does not mean that it no longer has an impact on the tourism resilience of Batangas City. 45.6% of community involvement in Batangas City is still resilient, or they will be able to recover from disruptions. Involving the community in restoring a tourism industry can help everyone to make it easier to adapt and recover after catastrophic events by planning, decision-making, and faster response when a disaster occurs.

Sustainable practices have a significant impact on tourism resilience in Batangas

The regression analysis in Table 7 confirms a statistically significant relationship between sustainable practices and tourism resilience in Batangas. With an R-squared value of 0.505, the model explains 50.5% of the variance in tourism resilience, and the p-value of .000 (significant at $\alpha = .05$) leads to the rejection of the null hypothesis. This provides strong empirical support for the claim that sustainable practices are a key driver of resilience in tourism systems.

Table 7. Sustainable Practices impacted Tourism resilience

Variables	Sustainable Practices Tourism Resilience
R-squared	0.505
Computed	19.67
P-value	0.000
Decision	Reject Ho
Conclusion	Significant

An R^2 of 0.505 indicates that over half of the variation in tourism resilience can be attributed to the adoption and implementation of sustainable practices. This is a robust finding, suggesting that environmental stewardship, resource conservation, and long-term planning are not peripheral but central to recovery and resilience. This finding aligns with the broader literature on sustainability and resilience. Mushtaha and Alaloul (2025) argue that sustainability in post-disaster contexts must encompass environmental, economic, and social dimensions to ensure long-term viability. In Batangas, practices such as proper waste management, tree planting, and sustainable tourism initiatives likely contributed to both ecological restoration and community empowerment.

Correspondingly, Yu et al. (2015) emphasize that resilience is not only about bouncing back but also about building forward better—a concept that sustainable practices inherently support. By reducing environmental

degradation and promoting responsible tourism, these practices enhance the system's ability to absorb shocks and adapt to future risks.

Moreover, Acuzar (2021) highlights that community-led environmental initiatives—such as pollution control and conservation—foster local ownership and strengthen the social fabric, which are essential components of resilience. While environmental quality was rated highly in previous tables, economic viability showed moderate scores. Vivien (2023) cautions that overemphasis on environmental sustainability without addressing economic recovery can lead to imbalanced outcomes. Therefore, sustainable practices must be holistic, ensuring that ecological gains are matched by inclusive economic revitalization and social equity.

The results from Table 7 align with Holling's (1973) classic resilience theory. The regression analysis in Table 6 confirms a statistically significant relationship between sustainable practices and tourism resilience in Batangas with an R-squared value of 0.505; the model explains 50.5% of the variance in tourism resilience, and the p-value of .000 supports the theory that a system's ability to bounce back from disruptions with the help of sustainable practices, like community-based projects (tree planting) and waste management. Also, the "Sustainable Practices" has an R-squared of 50.5% of the variance in tourism resilience. It can be explained by implementing environmentally and socially sustainable actions like the initiatives of their barangays and LGU, like tree planting, promoting conservation of resources, and proper waste disposal. These kinds of practices or initiatives can help the environment withstand the shocks of the catastrophes, and they can reduce vulnerability. Sustainable practices contribute to making tourism more resilient, stable, and prepared for upcoming difficulties.

Actionable Insights for Strengthening Tourism Resilience in Batangas

Based on the findings of this study, post-disaster recovery, community involvement, and sustainable practices all have a significant impact on the tourism resilience in Talisay, Batangas. However, the findings also identified areas that can be improved, which received the lowest rates of the results, particularly in the timeliness and adequacy of local assistance, the level of community participation in rebuilding, and the integration of economic and environmental support into recovery efforts.

For these gaps to be addressed, it is important to provide actionable recommendations that can guide in strengthening their capacity to withstand and recover from disasters. The following recommendations are intended to complement the existing initiatives within Talisay while offering practical measures that promote faster recovery, greater community involvement, and more sustainable practices in developing a resilient tourism industry.

Table 8. Recommendations to Complement Existing Initiatives

Strategy/Action	Stakeholders involved	Implementation approach	Expected impact/benefits
Eco-Tourism Income Diversification (Restoration Tours)	Local Communities (Tour Operators, Guides, Fishermen), LGU,	By developing tour packages that involve tourists in ecosystem restoration activities such as tree planting, mangrove planting, etc. A portion of the tour fee will go to disaster risk reduction (DRR) fund and community recovery programs.	This initiative addresses the relative challenges associated with the economic viability aspect ($M = 4.13$) of sustainable practices. It can provide a new source of income to be used for disaster recoveries. Moreover, it can strengthen natural defense by doing sustainable initiatives that help the environment. Lastly, it will educate and encourage tourists about resilience and sustainability.
Pre-disaster Infrastructure Mapping & Prioritization	LGU of Talisay, DPWH, Barangay officials	This approach involves identifying and categorizing important routes that link tourist destinations, medical facilities, and evacuation points; evaluating possible disaster-prone areas; and mapping these roads at the barangay or Geographic Information System (GIS) level. The priority list should be evaluated through annual drills with repair teams and incorporated into local tourism masterplans and disaster risk reduction management (DRRM).	This focuses on addressing the post-disaster recovery statement that received the lowest rating, which is the slow rebuilding of roads/infrastructure ($M = 3.91$) in a short period of two to four weeks. This promotes faster access and business recovery; the strategy makes sure that important routes are fixed immediately. This helps businesses to recover more quickly, and tourist destinations re-open faster. This reduces financial losses and promotes Talisay, Batangas as a safe and well-prepared travel destination.
Participatory Rebuilding Planning Meetings	Residents (spokesperson), Barangay Councils, LGU Tourism & Planning Office	This includes conducting meetings where residents identify their priority needs after disasters, and LGU integrates these into official recovery plans.	This initiative seeks to address the perception gap in community involvement, that even if residents participated, officials pay less attention to their needs ($M = 4.32$). The recommended actionable insight aims to amplify community voices and make authorities more responsive through these meetings among residents, the barangay, and the LGU, thereby facilitating faster recovery as authorities become more responsive to what the community really needs.
Transparent Tracking & Feedback Mechanism for Assistance	LGU, Barangays, Civil Society Groups	In line with the Participatory Rebuilding planning workshops, the LGU can post lists on barangay bulletin boards or an online page showing who already received assistance and what type of aid was given. They can also allow people to give feedback or complaints.	This strategy aims to improve the low rating for Statement 1 of the post-disaster recovery strategies: Assistance from local authorities was timely and adequate ($M = 4.15$). This promotes fairness and accountability and reduces perceptions of favoritism or delay to those affected by the disaster. This also builds trust to strengthen collaboration through stakeholders.
Maintaining Equipment & Infrastructure Security	LGU, MDRRMO	Establish a program to keep all Early Warning Systems equipment functional and secure. This includes keeping regular inspections for EWS equipment such as sirens, sensors, communication tools. Installing backup power such as solars or generators can also help to ensure operation continues during blackouts. This maintenance and security program ensures all sirens, signage, sensors, and routes are always working and protected in preparations for disasters.	This initiative does not address a low-rated statement but strengthens the high-rated Statement 10: "The recovery efforts have led to improved disaster preparedness for future events" ($M = 4.34$). It ensures the EWS equipment works reliably during disasters, reducing downtime and failures. This builds trust in the warning system and improves disaster response. It also strengthens tourism resilience by showing tourists that Talisay is a safe and well-prepared destination.
Develop Standardized Metrics for Tourism Resilience	LGU, Tourism Office, Academic Institutions, Disaster Risk Reduction and Management Office, Community	By developing a local resilience index that uses clear indicators such as safety, environmental sustainability, business continuity, and recovery capacity which will be aligned with international frameworks like the UNWTO and Sendai Framework, this initiative will strengthen existing disaster management. Data will be gathered through surveys and community workshops, where stakeholders can contribute their perspectives. Results will be consolidated and published annually in a Tourism Resilience Report Card to continuously monitor progress and guide future actions.	This approach seeks to establish a mechanism for ongoing improvement rather than concentrating on low-rated statements. This strategy offers a clear and measurable way to track progress and guide future actions. By combining technical data with community input, it ensures accuracy while promoting cooperation and accountability among stakeholders while improving Talisay's reputation as a safe and resilient tourism destination.

CONCLUSION

This study examined the contributions of post-disaster recovery strategies, community involvement, and sustainable practices to tourism resilience in Batangas, a region frequently affected by volcanic eruptions, earthquakes, and typhoons. Based on responses from 381 residents of Talisay, the quantitative results indicated that post-disaster recovery strategies ($R^2 = 0.520$), community involvement ($R^2 = 0.456$), and

sustainable practices ($R^2 = 0.505$) each had a statistically significant impact on tourism resilience ($p < 0.01$). Among these, environmental initiatives within sustainable practices showed the strongest effect, while active community participation played a key role in strengthening adaptive capacity and shaping overall resilience outcomes.

The study's implications are twofold:

Theoretical Implications. This study provides a theoretical advancement by presenting tourism resilience as relationships in which community involvement serves as the intermediary process that integrates sustainable practices and recovery efforts into long-term adaptability. The findings examined how tourism destinations recover after a disruption, how post-disaster recovery, community involvement, and sustainable practices helps the Batangas to recover from the natural disasters. The results support the applicability of Holling's Resilience Theory which is the ability of the ecosystem to adapt and absorb changes. The theory emphasis on long-term adaptability and sustainability in tourism recovery by engaging locals. Additionally, the study contributes to the existing discussion by presenting community involvement as a source for resilience and a result of sustainable recovery, focusing on the significance of collaboration and shared responsibility rather than managerial actions as the means by which resilience in tourism develops. The study thus strengthens resilience and sustainability theory by providing a combined framework useful for disaster-prone destinations for tourism seeking long-term transformation rather than short-term recovery.

Practical Implications. The findings reinforce the applicability of resilience theory in understanding tourism recovery and the role of community engagement in disaster-affected areas. From a practical standpoint, local government units, tourism offices, and community organizations may strengthen tourism resilience by enhancing environmental initiatives such as waste management and ecological conservation, promoting participatory planning and stakeholder engagement, and implementing structured economic and social recovery programs after disasters. Despite its contributions, this study has limitations. Its scope was confined to Talisay, Batangas, and the respondents were limited to local residents, excluding broader tourism stakeholders such as policymakers, business owners, and NGOs. Additionally, the purely quantitative approach limits the ability to capture community emotions, cultural meanings, and lived experiences, which are essential to a deeper understanding of resilience.

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Future research may expand the geographical scope to include multiple municipalities for comparative analysis and involve a wider range of tourism stakeholders to provide a more comprehensive perspective. Incorporating mixed method approaches that combine surveys with interviews or focus group discussions could deepen understanding by capturing community narratives and local ecological knowledge. Longitudinal studies may also be conducted to examine how tourism resilience evolves over time and in response to recurring climate-related risks.

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REFERENCES

- Abid, S. K., Sulaiman, N., Samman, B., Al-Wathinani, A. M., & Goniewicz, K. (2025). Cultural dynamics in Disaster Management: Exploring sociocultural influences on disaster response in Malaysia. *Disaster Medicine and Public Health Preparedness*, 19. <https://doi.org/10.1017/dmp.2025.68>
- Acuzar, A. M. (2021). Disaster Waste Management and its Benefits for Post-Disaster Recovery. *Auckland.ac.nz*. <https://researchspace.auckland.ac.nz/items/28076bde-d4ad-45ec-9001-120d8e49035d>
- Aldrich, D. P., & Meyer, M. A. (2015). Social capital and community resilience.
- Aparecio, D. E., & Torrejas, I. E. (2024). Post-Disaster Recovery: Evaluating business resilience in MSMeS in Monkayo, Davao de Oro. *International Journal of Research and Scientific Innovation*, 11(9), 331–337. <https://doi.org/10.51244/ijrsi.2024.1109029>
- Bakic, H., & Ajdukovic, D. (2021). Resilience after natural disasters: the process of harnessing resources in communities differentially exposed to a flood. *European Journal of Psychotraumatology*, 12(1). <https://doi.org/10.1080/20008198.2021.1891733>
- Baloch, Q. B., Shah, S. N., Iqbal, N., Sheeraz, M., Asadullah, M., Mahar, S., & Khan, A.U. (2022). Impact of Tourism Development upon Environmental sustainability: a Suggested Framework for Sustainable Ecotourism. *Environmental Science and Pollution Research*, 30(3), 5917–5930. NCB. <https://doi.org/10.1007/s11356-022-22496-w>
- Bannon, V., & Irving, H. (2020). LITERATURE REVIEW ON LAW AND DISASTER RECOVERY AND RECONSTRUCTION. IFRC. https://www.ifrc.org/sites/default/files/Final_Literature-Review-on-Law-and-Recovery.pdf
- Creswell, J. W., & Creswell, J. D. (2017). Research design: Qualitative, quantitative, and mixed methods approaches. Sage publications.
- Crow, D. A., & Albright, E. A. (2021). Community disaster recovery. <https://doi.org/10.1017/9781009053457>
- Cruz, R. (2019). Sustainable tourism (1st ed.). Philippines: Rex Publishing Inc.
- Fu, Y. K. (2020). The impact and recovering strategies of the COVID-19 pandemic: Lessons from Taiwan's hospitality industry. *Cogent Social Sciences*, 6(1). <https://doi.org/10.1080/23311886.2020.1829806>
- Doroteo, H. J. (2015). Philippines: disaster risk profile and disaster risk reduction (DDR) framework: natural calamities. University of Oviedo, Asturias, Spain, 1-46. DOI:10.13140/RG.2.1.4656.3922
- Dube, E. (2020). The build-back-better concept as a disaster risk reduction strategy for positive reconstruction and sustainable development in Zimbabwe: A literature study. *International Journal of Disaster Risk Reduction*, 43, 101401. <https://doi.org/10.1016/j.ijdrr.2019.101401>
- Emmanuel Adikwu Ukpoju, Adedayo Adefemi, Abimbola Oluwatoyin Adegbite, Obe Destiny Balogun, Bartholomew Obekioye Obaedo, & Ayodeji Abatan. (2024). A review of sustainable environmental practices and their impact on U. S. economic sustainability. *World Journal of Advanced Research and Reviews*, 21(1), 384–392. <https://doi.org/10.30574/wjarr.2024.21.1.2717>
- Enago. (2020). Ethical Considerations in Research. Retrieved from <https://www.enago.com/academy/2022-nutshell-reminiscing-year-opportunities-achievements/?form=MG0AV3>
- Espiner, S., Orchiston, C., & Higham, J. (2017). Resilience and sustainability: a complementary relationship? Towards a practical conceptual model for the sustainability–resilience nexus in tourism.

- Journal of Sustainable Tourism, 25(10), 1385–1400. <https://doi.org/10.1080/09669582.2017.1281929>
- Estevão, C., & Costa, C. (2020). Natural disaster management in tourist destinations: a systematic literature review. *European Journal of Tourism Research*, 25, 2502. <https://doi.org/10.54055/ejtr.v25i.417>
- Fatini, M. A., & Herwangi, Y. (2022). Factors that Influence Tourism Recovery, Post Disaster Earthquake in Sembalun Sub-District, East Lombok Regency. *Built Environment Studies*, 3(1), 27–40. <https://doi.org/10.22146/best.v3i1.1871>
- Fran H. Norris; Susan P. Stevens; Betty Pfefferbaum; Karen F. Wyche; Rose L. Pfefferbaum. (2008). Community Resilience as a Metaphor, Theory, Set of Capacities, and Strategy for Disaster Readiness. , 41(1-2), 127–150. doi:10.1007/s10464-007-9156-6
- Fronza, L. F., Umali, J. D., Salve Deinne E. Balantac, Mac, A., & Abel, J. V. (2025). Community-Driven Disaster Risk Reduction: Investigating Capacities and Vulnerabilities of Selected Barangay in Lipa, Batangas, Philippines. 2025 IEEE International Humanitarian Technology Conference (IHTC), 7–14. <https://doi.org/10.1109/IHTC65087.2025.11216321>
- Ganoe, M., Roslida, J., & Sihotang, T. (2023). The impact of volunteerism on community resilience in disaster management. *Jurnal Ilmu Pendidikan Dan Humaniora*, 12(3), 199–213. <https://doi.org/10.35335/jiph.v12i3.11>
- Ghanad, A. (2023). An Overview of Quantitative Research Methods. *Research Gate*; Everant Journals. https://www.researchgate.net/publication/373370007_An_Overview_of_Quantitative_Research_Methods
- Ghanem, Samar Khairy. (2018). The Relationship between Population and the Environment and Its Impact on Sustainable Development in Egypt Using a Multi-Equation Model. *Environment, Development and Sustainability*, 20: 305-342
- Gonzales, G. A. (2025). Comprehensive Sustainable Tourism Plan for Calatagan. *Scribd*. <https://www.scribd.com/document/957868396/Comprehensive-Sustainable-Tourism-Plan-for-Calatagan>
- Gowan, M. E., Kirk, R. C., & Sloan, J. A. (2014). Building resiliency: a cross-sectional study examining relationships among health-related quality of life, well-being, and disaster preparedness. *Health and Quality of Life Outcomes*, 12(1), 85. <https://doi.org/10.1186/1477-7525-12-85>
- GSTC. (2021). What Is Sustainable Tourism? Global Sustainable Tourism Council (GSTC). <https://www.gstccouncil.org/what-is-sustainable-tourism/>
- Hajian, M., & Jangchi Kashani, S. (2021). Evolution of the concept of sustainability. From Brundtland Report to sustainable development goals. *Sustainable Resource Management*, 1–24. <https://doi.org/10.1016/b978-0-12-824342-8.00018-3>
- Hallegatte, S., Rentschler, J., & Rozenberg, J. (2019). Lifelines: The resilient infrastructure opportunity. *World Bank Publications*. <https://hdl.handle.net/10986/31805>
- Hamideh, S. (2020). Opportunities and Challenges of Public Participation in Post-Disaster Recovery Planning: Lessons from Galveston, TX. *Natural Hazards Review*, 21(4). [https://doi.org/10.1061/\(asce\)nh.1527-6996.0000399](https://doi.org/10.1061/(asce)nh.1527-6996.0000399)
- Hamideh, S., Loos, S., Rivera, J., Jerolleman, A., Champeau, H., & Wu, H. (2023). IJMED special issue: Longitudinal recovery. *International Journal of Mass Emergencies & Disasters*, 41(1), 4–8. <https://doi.org/10.1177/02807270231184213>
- Harahap, G. Y. (2020). Instilling Participatory Planning in Disaster Resilience Measures: Recovery of Tsunami-affected Communities in Banda Aceh, Indonesia. *Budapest International Research in Exact Sciences (BirEx) Journal*, 2(3), 394-404. DOI: <https://doi.org/10.33258/birex.v2i3.1085>
- Holling, C. S. (1973). Resilience and stability of ecological systems. *Annual Review of Ecology and Systematics*, 4(1), 1–23. <https://doi.org/10.1146/annurev.es.04.110173.000245>
- Ichinosawa, J. (2006). Reputational disaster in Phuket: the secondary impact of the tsunami on inbound tourism. *Disaster Prevention and Management an International Journal*, 15(1), 111–123. <https://doi.org/10.1108/09653560610654275>
- Iuchi, K., & Mutter, J. (2020). Governing community relocation after major disasters: An analysis of three different approaches and its outcomes in Asia. *Progress in Disaster Science*, 6, 100071. <https://doi.org/10.1016/j.pdisas.2020.100071>
- Islam, E., Wahab, H. A., & Benson, O. G. (2020). Structural and operational factors as determinants of meaningful community participation in sustainable disaster recovery programs: The case of Bangladesh. *International Journal of Disaster Risk Reduction*, 50, 101710. <https://doi.org/10.1016/j.ijdr.2020.101710>
- Jerolleman, A. (2020). Challenges of Post-Disaster Recovery in Rural Areas. In: Laska, S. (eds) *Louisiana's Response to Extreme Weather. Extreme Weather and Society*. Springer, Cham. https://doi.org/10.1007/978-3-030-27205-0_11
- Kaniasty, K. (2019). Social support, interpersonal, and community dynamics following disasters caused by natural hazards. *Current Opinion in Psychology*, 32, 105–109. <https://doi.org/10.1016/j.copsyc.2019.07.026>
- Khawar, R., Malik, F., Maqsood, S., Yasmin, T., & Habib, S. (2013). Age and gender differences in emotion recognition ability and intellectual functioning. *Journal of behavioral sciences*, 23(3), 53-71.
- Kim, J. H. (2019). Multicollinearity and misleading statistical results. *Korean Journal of Anesthesiology*, 72(6), 558–569. <https://doi.org/10.4097/kja.19087>
- Koopman, J. (2021). The restoration of gotong royong as a form of post-disaster solidarity in Lombok, Indonesia. *South East Asia Research*, 29(3), 279–296. <https://doi.org/10.1080/0967828X.2021.1966318>
- Kumar, P., Sharma, L., & Nikhilesh Chandra Sharma. (2024). Sustainable Development Balancing Economic Viability, Environmental Protection, and Social Equity. *Advances in Logistics, Operations, and Management Science Book Series*, 212–234. <https://doi.org/10.4018/979-8-3693-2197-3.ch012>
- Liao, K., & Hu, Y. (2025). Factors influencing disaster preparedness behaviors of older adults. *PLoS ONE*, 20(2), e0315617. <https://doi.org/10.1371/journal.pone.0315617>
- Lin, Y., Kelemen, M., & Tresidder, R. (2018). Post-disaster tourism: building resilience through community-led approaches in the aftermath of the 2011 disasters in Japan. *Journal of Sustainable Tourism*, 1–18. <https://doi.org/10.1080/09669582.2018.1511720>
- Lin, Y., Kelemen, M., & Kiyomiya, T. (2021). Bridging community resilience and sustainable tourism development via post-disaster education tourism in rural Japan. *The Journal of Organization and Discourse*, 2(1), 32–44. https://doi.org/10.36605/jscos.2.1_32
- Liu, L.-W., Pahrudin Pahrudin, Tsai, C.-Y., & Hao, L. (2024). Disaster, risk and crises in tourism and hospitality field: A pathway toward tourism and hospitality management framework for resilience and recovery process. *Natural Hazards Research*, 4(4). <https://doi.org/10.1016/j.nhres.2024.06.001>
- Loayza, N. V., Olaberria, E., Rigolini, J., & Christiaensen, L. (2012). Natural Disasters and Growth: Going beyond the averages. *World Development*, 40(7), 1317–1336. <https://doi.org/10.1016/j.worlddev.2012.03.002>
- Marsh, G., Ahmed, K. I., Mulligan, M., Donovan, J., & Barton, S. (Eds.). (2017). *Community engagement in post-disaster recovery*. Taylor & Francis. <https://doi.org/10.4324/9781315534213>

- McClelland, A. G., Shaw, D., O'Grady, N., & Fattoum, A. (2022). Recovery for Development: A Multi-Dimensional, Practice-Oriented Framework for Transformative Change Post-Disaster. *The Journal of Development Studies*, 59(1), 1–20. <https://doi.org/10.1080/00220388.2022.2130055>
- Medway, P., Barrena, I., & Gonzalez, L. (2020, September). Six Country Evaluation of Oxfam America's Strengthening Community Preparedness, Rapid Response and Recovery in Asia/Pacific Islands and Central America. OXFAM. https://webassets.oxfamamerica.org/media/documents/APLIFT_ATECA_Final_Evaluation_COMPLETED_NpRr2J3.pdf
- Monteil, C., Simmons, P., & Hicks, A. (2019). Post-disaster recovery and sociocultural change: Rethinking social capital development for the new social fabric. *International Journal of Disaster Risk Reduction*, 42, 101356. <https://doi.org/10.1016/j.ijdrr.2019.101356>
- Moroney, J. D. P., Schear, J. A., Acosta, J. D., Garber, C., Heintz, S., Hornung, J. W.,
- Moshakova, E. (2021). The recovery of a tourist destination after a natural disaster. Auckland University of Technology, TUWHERA.
- Mushtaha, A. W., & Alaloul, W. S. (2025). Sustainability Factors Influencing Post-Disaster Reconstruction Projects: Critical Review and Bibliometric Analysis. *Sustainable Futures*, 100930. <https://doi.org/10.1016/j.sfr.2025.100930>
- Ngulube, N. K. (2024). Building Back Better Together: Exploring Community Engagement in Post-Disaster Recovery Efforts - a review. *Journal of Multidisciplinary Research Advancements*, 2(2), 138–149. <https://doi.org/10.3126/jomra.v2i2.73082>
- Ngulube, N. K., Tatano, H., & Samaddar, S. (2023). Community Insights: Citizen Participation in Kamaishi Unosumai Decade-Long Recovery from the Great East Japan Earthquake. *International Journal of Disaster Risk Science*, 14(6), 886–897. <https://doi.org/10.1007/s13753-023-00527-5>
- Ngulube, N. K., Tatano, H., & Samaddar, S. (2024). Factors impacting participatory Post-Disaster relocation and housing reconstruction: the case of Tsholotsho District, Zimbabwe. *International Journal of Disaster Risk Science*, 15(1), 58–72. <https://doi.org/10.1007/s13753-024-00536-y>
- Norris, F. H., Stevens, S. P., Pfefferbaum, B., Wyche, K. F., & Pfefferbaum, R. L. (2008). Community resilience as a metaphor, theory, set of capacities, and strategy for disaster readiness. *American Journal of Community Psychology*, 41(1–2), 127–150. <https://doi.org/10.1007/s10464-007-9156-6>
- Nurjanah, A., Mutiarin, D., Apriliani, R., Manaf, H. A., & Jovita, H. (2024). Community as Stakeholders of Disaster Mitigation at Objects with Tourist Attractions in Sleman Regency in realizing Sustainable Tourism. *E3S Web of Conferences*, 594, 01006. <https://doi.org/10.1051/e3sconf/202459401006>
- OECD. (2015). The resilience of economies to disasters. Organisation for Economic Co-operation and Development. <https://www.oecd.org/economy/resilience>
- Owen, C. (2018). How can governments enable and support community-led disaster recovery? *The Australian Journal of Emergency Management*, 33(1), 66–69. <https://search.informit.org/doi/10.3316/informit.456370123062555>
- Pandey, R., Kumar, P., Archie, K. M., Gupta, A. K., Joshi, P. K., Valente, D., & Petrosillo, I. (2018). Climate change adaptation in the western-Himalayas: Household level perspectives on impacts and barriers. *Ecological Indicators*, 84, 27–37. <https://doi.org/10.1016/j.ecolind.2017.08.021>
- Pyke, J., Law, A., Jiang, M., & De Lacy, T. (2018). Learning from the locals: the role of stakeholder engagement in building tourism and community resilience. *Journal of Ecotourism*, 17(3), 206–219. <https://doi.org/10.1080/14724049.2018.1505586>
- Rachmad, Yoesoep Edhie. 2022. Communication Resilience Theory. Santarém Gótico Publicações Internacionais, Edição Especial 2022. <https://doi.org/10.17605/osf.io/m687a>
- Rahmani, M., Muzwagi, A. & Pumariega, A.J. Cultural Factors in Disaster Response Among Diverse Children and Youth Around the World. *Curr Psychiatry Rep* 24, 481–491 (2022). <https://doi.org/10.1007/s11920-022-01356-x>
- Ranghieri, F., & Ishiwatari, M. (2014). Learning from Megadisasters: Lessons from the Great East Japan Earthquake. Global Facility for Disaster Reduction and Recovery (GFDRR). <https://www.gfdr.org/sites/default/files/publication/Learning%20from%20Megadisasters%20%20Lessons%20from%20the%20Great%20East%20Japan%20Earthquake.pdf>
- Rasool, Yasir, Jianguo Du, and Kishwar Ali. (2024). Exploring the Linkage between Globalization and Environmental Degradation: A Disaggregate Analysis of Indonesia. *Environment Development and Sustainability*, 26: 16887–16915.
- Roselló, J., Becken, S., & Santana-Gallego, M. (2020). The effects of natural disasters on international tourism: A global analysis. *Tourism Management*, 79, 104080. <https://doi.org/10.1016/j.tourman.2020.104080>
- Rouhanizadeh, B., Kermanshachi, S., & Nipa, T. J. (2020). Exploratory analysis of barriers to effective post-disaster recovery. *International Journal of Disaster Risk Reduction*, 50, 101735. <https://doi.org/10.1016/j.ijdrr.2020.101735>
- Ryan, B., Johnston, K. A., Taylor, M., & McAndrew, R. (2020). Community engagement for disaster preparedness: A systematic literature review. *International Journal of Disaster Risk Reduction*, 49, 101655. <https://doi.org/10.1016/j.ijdrr.2020.101655>
- Sab, C., Dotong, C. I., & Calayan, A. (2025). Systems thinking in disaster risk reduction: A strategic framework for tourism resilience in Batangas. Lyceum of the Philippines University – Batangas.
- Salthouse, T. A., Atkinson, T. M., & Berish, D. E. (2003). Executive functioning as a potential mediator of Age-Related cognitive decline in normal adults. *Journal of Experimental Psychology General*, 132(4), 566–594. <https://doi.org/10.1037/0096-3445.132.4.566>
- Sanderson, D., Heffernan, T., DeSisto, M., & Shearing, C. (2024). Community-centred disaster recovery: A call to change the narrative. *Disasters*. <https://doi.org/10.1111/disa.12655>
- Sarker, M. N. I., Peng, Y., Yiran, C., & Shouse, R. C. (2020). Disaster resilience through big data: Way to environmental sustainability. *International Journal of Disaster Risk Reduction*, 51, 101769. <https://doi.org/10.1016/j.ijdrr.2020.101769>
- Saul, J. (2021b). Collective trauma, collective healing. <https://doi.org/10.4324/9781003231448>
- Senimoli, A., Tabe, T., & Combes, H. J. D. (2020). Influence of Socio-Cultural factors on community disaster response during TC Winston: a case study of Burenitu Village, Fiji. *International Journal of Safety and Security Engineering*, 10(3), 343–350. <https://doi.org/10.18280/ijss.100305>
- Serter, M., & Gumusburun Ayalp, G. (2024). A Holistic Analysis on Risks of Post-Disaster Reconstruction Using RStudio Bibliometrix. *Sustainability*, 16(21), 9463. <https://doi.org/10.3390/su16219463>
- Sobhaninia, S. (2023). Does social cohesion accelerate the recovery rate in communities impacted by environmental disasters in Puerto Rico? An analysis of a community survey. *Environmental Advances*, 13, 100400. <https://doi.org/10.1016/j.envadv.2023.100400>
- Spicka, J., Hlavsa, T., Soukupova, K., & Stollbova, M. (2019). Approaches to estimation the farm-level economic viability and sustainability in agriculture: A literature review. *Agricultural Economics (Zemědělská Ekonomika)*, 65(No. 6), 289–297. <https://doi.org/10.17221/269/2018-agricecon>
- future directions. *Tourism Review International*, 25(2), 79–88.

- Tuhkanen, H. (2023). Shifting power through participation in post-disaster recovery: A scoping review. *International Journal of Disaster Risk Reduction*, 97, 104041. <https://doi.org/10.1016/j.ijdr.2023.104041>
- Van Onselen, V., Ota, M., Pratiwi, E., Lin, W., & Lin, T. (2025). Community involvement in ecosystem-based disaster risk reduction: a scoping review to guide assessment metrics. *IOP Conference Series Earth and Environmental Science*, 1443(1), 012010. <https://doi.org/10.1088/1755-1315/1443/1/012010>
- Villacin, D. T. (2017). A review of Philippine government disaster financing for recovery and reconstruction. *Www.econstor.eu*. <https://www.econstor.eu/handle/10419/173598>
- Vivien, S. (2023). Sustainable Development: Balancing Economic Prosperity and Environmental Concerns. *Journal of Economics and Economic Education Research*, 24 (4), 1–3. <https://www.abacademics.org/articles/sustainable-development-balancing-economic-prosperity-and-environmental-concerns-16224.html>
- Vizconde, A. M. L., & Felicen, S. S. (2012). Tourism Industry of Batangas Province, Philippines: Basis for Improved Tourism Program. *International Association of Multidisciplinary Research Journal*, 3(1), 317-334.
- Wang, S., Wang, J., Li, J., & Yang, F. (2020). Do motivations contribute to local residents' engagement in pro-environmental behaviors? Resident-destination relationship and pro-environmental climate perspective. *Journal of Sustainable Tourism*, 28(6), 834–852. <https://doi.org/10.1080/09669582.2019.1707215>
- Wearing, S., Beirman, D., & Grabowski, S. (2020). Engaging volunteer tourism in post-disaster recovery in Nepal. *Annals of Tourism Research*, 80, 102802. <https://doi.org/10.1016/j.annals.2019.102802>
- World Bank. (2020). *Resilient Tourism: Competitiveness in the Face of Disasters*. Washington, DC: World Bank. [tps://openknowledge.worldbank.org/server/api/core/bitstreams/7b1611f4-df2e-5226-979a-891e3149b811/content](https://openknowledge.worldbank.org/server/api/core/bitstreams/7b1611f4-df2e-5226-979a-891e3149b811/content)
- Yang, E., Kim, J., Pennington-Gray, L., & Ash, K. (2021). Does tourism matter in measuring community resilience? *Annals of Tourism Research*, 89, 103222. <https://doi.org/10.1016/j.annals.2021.103222>
- Ylagan, A. P., & Laguador, J. M. (2014). Tourism Studies in the Province of Batangas, Philippines: A. *International Journal of Management*, 4(10), 421-428.
- Yu, S., Kim, S.-W., Oh, C.-W., An, H., & Kim, J.-M. (2015). Quantitative assessment of disaster resilience: An empirical study on the importance of post-disaster recovery costs. *Reliability Engineering & System Safety*, 137, 6–17. <https://doi.org/10.1016/j.ress.2014.12.007>
- Zhang, F., Lv, Y., & Sarker, M. N. I. (2024). Resilience and recovery: A systematic review of tourism governance strategies in disaster-affected regions. *International Journal of Disaster Risk Reduction*, 103, 104350. <https://doi.org/10.1016/j.ijdr.2024.104350>