



NRCP
RESEARCH JOURNAL

Full Paper

Exploring Community Support for Sustainable Tourism Governance at Lake Balinsasayao and Lake Danao

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The Philippines has numerous lakes that hold significant potential for ecotourism development. These lakes are excellent alternatives to the country's predominant sun, sea, and sand tourism. Tourism fuels sustainable development by generating income, reducing poverty, and enhancing livelihoods, particularly in the rural and isolated communities. Active resident support facilitates this, which drives culturally, environmentally, and economically beneficial initiatives. However, prominent works on community support for the sustainable development of lake tourism in the Philippines are limited. To address the gap, this work intends to provide a better understanding of resident satisfaction with sustainable lake tourism development and its influence their support for such initiatives. This work intends to (1) characterize the residents in sustainable lake tourism sites, (2) assess the link between the perceived positive and negative impact of tourism on residents with their satisfaction, (3) examine the correlation link between satisfaction with community involvement, community attachment, and with resident support to sustainable lake tourism development, and (4) examine the relationships using Partial Least Squares Structural Equation Modeling. The findings indicate that the perceived positive impacts of tourism are associated with residents' satisfaction, while perceived negative impacts are negatively linked with their satisfaction. Furthermore, satisfaction is linked with community involvement and community attachment. Residents' satisfaction and involvement in the community are associated with their support for sustainable lake tourism development. However, resident attachment to the community is found to have no direct link with their support for sustainable lake tourism development. This work offers theoretical and policy insights to enhance residents' support for sustainable tourism development in lakes, and the stakeholders could design strategies that align with community interests and concerns.

Keywords: lake tourism; sustainable development; community-based, resident support

Article history

Received : February 8, 2024

Revised : May 10, 2024

Accepted: May 13, 2024

Introduction

Tourism is one of the fastest-growing industries on a global scale, providing economic, social, and environmental benefits (Fang, 2020). It is also one of the largest and most profitable growing industries (WTTC, 2017). Tourism is projected to account for USD 8.3 trillion, 10.4 % of global GDP in 2017, and 313.2 million jobs or 9.9 % of total global employment (WTTC, 2018). Tourism is crucial for sustainable development as it efficiently catalyzes socio-economic development (Altinay et al., 2005), benefiting rural and isolated communities with limited access to opportunities through development dispersion. Tourism harnesses human and natural attractions to drive sustainable development by diversifying economies, generating employment, empowering local communities, preserving heritage, distributing income equitably, improving infrastructure and services, and decreasing emigration (Arntzen et al., 2007; Kim et al., 2020; Moridsadat et al., 2020). The rise of tourism in rural and mountainous regions, particularly around lakes, is evident with the development of new tourist sites. The COVID-19 pandemic and its associated international travel restrictions have created an opportunity to enhance the development of lake attractions. Based on observation, lakes present a distinctive alternative to conventional sun, sea, and sand tourism in the Philippines. Globally, renowned lakes like Tahoe, Como, Kawaguchi, and Moraine attracts visitors due to their natural beauty, supporting local economies, and encouraging travel to rural and mountainous areas. As a result, lakes are gaining popularity as alternative destinations to the Philippines' well-known tourist spots. Fostering sustainable tourism development around these lakes has the potential to improve the livelihoods of local communities and maintain growth in sustainable tourism.

The active involvement of local communities is significant in achieving sustainable tourism development (Khalid et al., 2019). Involving locals in policy decisions enhances trust in tourism initiatives and addresses economic needs while preserving the

destination's identity and sustainability. While the tourism literature predominantly focused on coastal destinations (e.g., water-based), limited attention has been given to inland waters, particularly lakes. The works of Pengwei and Linsheng (2018), Kurniawati and Aliman (2020), Wang (2021), and Angessa et al. (2022). Pengwei and Linsheng (2018) explored the tourists' willingness to pay for the protected ecotourism resources in Hulun Lake. They found that income, the awareness of being in a protected area, and the trust in authorities significantly affected tourists' willingness to pay. Kurniawati and Aliman (2020) highlighted that the involvement of environmental groups is crucial for maintaining tourist attractions and protecting Buret Lake. Environmental protection and local knowledge preservation must be done sustainably. Wang (2021) proposed using the remote sensing ecological index to assess the lake wetland ecotourism resources in Manas Lake. They found that the growing human activities are the main reason for wetland degradation. Previous literature has explored development in various lakes in the Philippines, including Lake Bunot (Brillo, 2015b), Mohicap Lake (Brillo, 2015c), Palakpak Lake (Brillo, 2016a), Yambo Lake (Brillo, 2016b), Calibato Lake (Brillo, 2016c), Sampaloc Lake (Brillo, 2016d, 2017d), Pandin Lake (Brillo, 2016e, 2017d, 2020a), Dagatan Lake (Brillo, 2017a), Seven Crater Lakes (Brillo, 2017b), Gunao Lake, Tikub Lake, and Dagatan Lake (Brillo, 2017c), Tadalac Lake (Brillo, 2017d), Gunao Lake (Brillo, 2020b), and Tikub Lake (Anastacio & Brillo, 2020). However, most lake studies in the Philippine context primarily focus on natural and social sciences related to the administration and developmental issues of lakes in the country. Research on lakes in the Philippines focused on tourism are also limited (see Brillo, 2016e; 2020a; 2021).

Residents' perceptions of tourism impact significantly shape their support, participation, and decisions regarding sustainable development (Stylidis et al., 2014). Community involvement promotes culturally sensitive, environmentally responsible, and economically beneficial initiatives.

Furthermore, community support strengthens destination social cohesion, fosters stakeholder collaboration, and promotes equitable distribution of tourism benefits. While several works have emphasized the importance of community involvement in sustainability efforts, limited attention has been given to the perspective of community support for sustainable lake tourism development (see works of Infield & Namara, 2001; Malayang III et al., 2002; Meixler et al., 2005; Winkler et al., 2023). Anastacio and Brillo (2020) emphasized the overlooked status of numerous small lakes in the country regarding tourism activity that resulted in their underdevelopment, arbitrary regulation, and ecological vulnerability. The scarcity of baseline data, management strategies, and scholarly works on small lakes compounds this issue. Hence, this study focused on identifying and evaluating residents' satisfaction, involvement, attachment, and impact on their support for sustainable lake tourism development. To fill this gap in the literature, this study aims to deepen the comprehension of sustainable tourism, focusing on the frequently underestimated potential of lakes in the Philippines. These lakes, which are not traditionally regarded as primary tourist destinations within the country, represent an overlooked opportunity for sustainable tourism development.

Thus, this work explores the antecedents of the resident support for sustainable lake tourism development. First, it presents an empirical model that explains the association of perceived positive and negative impacts of tourism, community involvement, community attachment, and residents' satisfaction with support for sustainable lake tourism development. Secondly, it evaluated the model for support for sustainable tourism development of lakes using Partial Least Square Structural Equation Modeling (PLS-SEM). This work utilized PLS-SEM to fill existing gaps by constructing and validating the theoretical model. Its primary objectives encompass characterizing residents in sustainable lake tourism sites, identifying key factors influencing their satisfaction through an extensive literature review, analyzing relationships among these factors via PLS-SEM, and exploring the impact of residents' satisfaction on support for sustainable lake tourism development. The proposed theoretical model was empirically tested through case studies of two prominent lakes in the Philippines: Balinsasayao Lake (Sibulan, Negros Oriental) and Lake Danao (Ormoc, Leyte). These lakes hold ecological importance as natural parks, but despite their importance, they remain relatively underdeveloped as tourist destinations and hold

potential for further development. Their geographical diversity allows for a broader understanding of the Philippines' community dynamics and tourism development. Additionally, this work analyzes the association of community satisfaction to their attachment involvement in the planning, execution, and governance, shedding light on their perspective regarding sustainable lake tourism development. Resident support is crucial for tourism development as it fosters engagement, enhances destination authenticity, and ensures long-term sustainability.

This work also aims to provide policymakers and lake tourism managers with invaluable insights on resident satisfaction and support for sustainable lake tourism development in facilitating sustainable development strategies and informed decision-making processes (e.g., resource allocation). Aligned with the United Nations Sustainable Development Goals (SDGs), this work contributes notably to Goal 8, emphasizing the promotion of decent work and economic growth. By directing attention and investments towards rural areas and fostering the development of lake destinations, our findings may aid in dispersing development and bolstering local economies. Furthermore, our study aligns with Goal 9, focusing on resilient infrastructure, sustainable industrialization, and innovation. Through the advancement of lake tourism, we advocate for essential infrastructure investments that enhance the tourist experience and contribute to long-term community development and resilience. Steering this work in developing countries like the Philippines, where lakes are less popular as tourist attractions, is highly relevant for several reasons. First, it offers sustainable opportunity to diversify the tourism sector, particularly in rural areas where lakes are often located. Second, focusing on sustainable lake tourism development may support the conservation of lake ecosystems (e.g., ecological fee). Thirdly, it may stimulate infrastructure investment, benefiting tourists and local residents. Lastly, engaging local communities in tourism empowers them to participate in decision-making, fostering inclusive and sustainable development. Furthermore, the insights in this work are intended to guide policymakers and stakeholders in promoting sustainable development while preserving the lakes' ecological and cultural integrity. The findings can shape policy-making towards more inclusive and sustainable tourism strategies, enhancing the management and governance of sustainable lake tourism initiatives.

Literature Review and Hypotheses Development

Sustainable tourism development

Sustainable tourism development (STD) has been extensively examined in tourism planning and development (Khalid et al., 2019). STD aims to optimize benefits, enhance tourist experiences, and involve local communities while minimizing costs (Lindberg & Johnson, 1997; Choi & Sirakaya, 2005; Adeyemo & Bada, 2017). Utilizing community-based tourism is an effective strategy for achieving STDs, ensuring equitable distribution of benefits, and preserving natural resources (Khalid et al., 2019). Residents must comprehend both tourism's potential benefits and costs to actively contribute to the planning process (Adetola & Adedira, 2014). Particularly in the least developed countries, the sustainability of nature-based tourism relies on local community engagement. Local involvement in STD can yield various benefits, including effective environmental stewardship based on indigenous knowledge, economic development, social empowerment, cultural heritage protection, and educational experiences for tourists (Jamal & Stronza, 2009). Engaging locals in the planning process enhances their awareness of impacts, fosters a sense of belongingness and ownership, and secures their support for development initiatives.

Support for sustainable tourism development

Prior works in the literature emphasized the vital role of locals' cooperation, support, and participation in the success of STD initiatives (Khalid et al., 2019). Locals' involvement in tourism initiatives is critical in determining the perception of the locals' tourism impact. Moreover, locals' involvement in tourism planning, management, and development influences their support for tourism (Khalid et al., 2019). Nunkoo and Ramkissoon (2011) examined locals' support for tourism development with Social exchange theory. The model included community satisfaction with neighborhood conditions, community commitment, and satisfaction with community services. They found that locals' satisfaction with neighborhood conditions and community services is vital to tourism's perceived positive and negative impacts. Eslami et al. (2019) studied the locals' support for sustainable tourism development based on the social exchange theory and bottom-up spillover theory. It supported the claim that the overall quality of life satisfaction influenced support for sustainable tourism development. However, there are limited works and a lack of theoretical models exploring the locals' support for sustainable

tourism development (SSTD) (Lee, 2013; Nicholas et al., 2017; Eslami et al., 2019).

Social exchange theory

Social exchange theory (SET) believes that individuals share resources with the expectation of reciprocity (Emerson, 1976). According to SET, individuals are self-centered thus, exchange behaviors appear self-centered and selfish (Blau, 1964). Social exchanges occur in interdependent relationships where individuals could maximize the reward by consulting decisions (Cropanzano & Mitchell, 2005). An individual will primarily assess the potential rewards gained from engaging with others. Social exchange will not occur if neither of the two parties receives adequate rewards. The goal of human behavior, according to SET, is to maximize benefits while minimizing costs (Yin, 2018). SET is one of the most influential theories in management (Cropanzano & Mitchell, 2005). It has been applied in various contexts, such as social networks (Huang et al., 2018; Ghafari et al., 2018; Urbonavicius et al., 2021), leadership (Zhang et al., 2018; Fan et al., 2021), education (Romani-Dias & Carneiro, 2019), and residents' perception (Jani, 2018), among others. Thus, this work uses the SET as a foundation to investigate the locals' satisfaction and its influence on supporting sustainable tourism development. SET could explain that locals may determine their support for tourism development depending on their satisfaction. With SET, the locals who have gained more benefits than costs of tourism are more supportive of sustainable tourism development and would participate in an exchange interaction for value (Eslami et al., 2019). Several works have extended SET as their theoretical framework in locals' support and have examined various extended factors (Lopez-Guzman et al., 2011; Nunkoo & Ramkissoon, 2012; Styliadis & Terzidou, 2014; Strzelecka et al., 2017).

Hypotheses Development

Perceived impacts of tourism on resident satisfaction

Tourism development introduced diverse economic, socio-cultural, and environmental changes to the host communities with varied outcomes (Lee, 2013). It has the potential to enhance the local economy through job creation, improved living standards, cultural exchanges, and recreational opportunities, and contribute to environmental protection and community revitalization (Yoon et al., 2001; Tosun, 2006; Theobald, 2012; Kim & Park, 2017). However, potential negative impacts include increased

prices of commodities, higher living costs, traffic congestion, and raised crime rates (Andriotis & Vaughan, 2003). Additionally, tourism development may disrupt the local ecosystem, resulting in lake and area pollution and straining natural resources. Cultural changes and potential consequences of tourism development also affect traditional practices and local values (Stylidis et al., 2014; Zhuang et al., 2019). Residents often express skepticism or hesitation toward tourism development when prioritizing its negative economic, environmental, and social aspects (Andriotis & Vaughan, 2003). Striking a balance between positive impacts on the economy, society, and environment is crucial for fostering a positive attitude among residents (Zhang et al., 2016; Sharpley, 2014). Resident satisfaction as a critical factor for tourism development success is evident in numerous works emphasizing the importance of understanding residents' perceptions of tourism impacts and their support for sustainable approaches for effective planning (e.g., Stylidis & Terzidou, 2014; Chow et al., 2019; Wang et al., 2019; Kanwal et al., 2020). Thus, this study hypothesizes the following as presented in the conceptual framework (Figure 1):

H1. Perceived positive impacts have a positive and significant relationship with resident satisfaction

H2. Perceived negative impacts have a negative and significant relationship with resident satisfaction

Resident satisfaction with resident support for sustainable lake tourism development

Recognizing the pivotal role of residents in the success and sustainability of tourism projects, understanding their perspectives, and securing their support is crucial for local authorities, policymakers, and businesses (Lee, 2013; Yu et al., 2018). Resident satisfaction (RS) significantly influences their supportive behavior toward tourism development, directly impacting community satisfaction levels (Ekici & Cizel, 2014; Uysal et al., 2016). Positive responses from residents, significantly when they directly benefit from tourism, lead to more favorable attitudes and increased support (Gursoy et al., 2017; Kanwal et al., 2020). RS is a critical indicator in community development and planning, reflecting residents' contentment with their surroundings (Kim et al., 2013). Achieving sustainability in tourism development becomes challenging without community support and participation (Gursoy & Rutherford, 2004; Lee, 2013). The local community's involvement and support are vital for effective planning, implementation, and the long-term sustainability of tourism (Jurowski, 1994). RS

and their community are inclined to engage more actively in community activities and initiatives that offer them economic benefits and enable oversight and mitigation of negative impacts (Rasoolimanesh & Jaafar, 2017). They may be more inclined to provide their time, share their skills and resources, work with others to solve community issues and achieve shared goals such as sustainable tourism initiatives (Adongo et al., 2017; Orgaz-Agüera et al., 2022). Satisfied residents tend to develop attachment and belonging to the community, encouraging them to contribute to the community's well-being and progress. Numerous studies in the literature highlight the influence of resident satisfaction on their perspective and support for tourism development, especially in rural areas with lake tourism initiatives. Some of these studies explore residents' perceptions of tourism impacts and their backing for tourism development (e.g., Lee et al., 2010; Nunkoo & Ramkissoon, 2011a; 2011b). Thus, this study hypothesizes the following as presented in the conceptual framework (Figure 1):

H3. Resident satisfaction has a positive and significant relationship with community involvement.

H4. Resident satisfaction has a positive and significant relationship with community attachment.

H5. Resident satisfaction has a positive and significant relationship with support for sustainable lake tourism development

Community involvement with support for sustainable lake tourism development

Tourism literature emphasizes the significance of involving grassroots communities to foster self-sufficiency and enhance residents' quality of life (Cooper & Hall, 2016; Lu et al., 2016). Community involvement (CI) plays a pivotal role in advancing community-based tourism, as it amplifies the benefits of tourism while mitigating its drawbacks (Lepp, 2007). While the importance of residents' involvement in their communities has been widely acknowledged as a gauge of support for tourism development (Tosun, 1998), scant attention has been given in investigating the direct correlation between community involvement and backing for sustainable tourism development (Lee, 2013). CI in tourism faces various impediments, including a deficiency in crucial knowledge and skills pertinent to the industry. Some residents refrain from engaging in tourism due to the seasonal, part-time nature of available jobs, which often offer low pay and poor quality (Rasoolimanesh et al., 2018). Communities near protected areas in developing countries face

higher conservation costs, prompting managers to adopt participatory approaches, provide benefits and reduce conflicts, increase conservation support, and ease pressure on ecosystems, highlighting the importance of CI and institutional cooperation (Carius & Job, 2021). CI entails coordinating and compromising through participatory decision-making and sharing benefits and responsibilities (Li & Hunter, 2015). CI in sustainable tourism development offers residents economic benefits and allows them to oversee and mitigate negative impacts (Rasoolimanesh & Jaafar, 2017; Tosun, 2000). Thus, this study hypothesizes the following as presented in the conceptual framework (Figure 1):

H6. Community involvement has a positive and significant relationship with support for sustainable lake tourism development

Community attachment with support for sustainable lake tourism development

Community attachment (CA) refers to the residents' social integration and involvement in community life that reflects the emotional bond with the community (McCool & Martin, 1994). It encompasses residents' strong positive emotions, rootedness, and sense of

belonging, which significantly influence support for tourism development (Brehm et al., 2004; Matarrita-Cascante et al., 2010). A stronger CA among residents correlates with a positive inclination towards tourism and its development (Adongo et al., 2017). CA has been consistently utilized to assess its influence on communities' perceptions and attitudes toward tourism support models (Nicholas et al., 2009; Brida et al., 2014; Adongo et al., 2017). Similarly, Huong and Lee (2017) found that residents with a strong CA held positive perceptions of tourism across various dimensions, which increased support for tourism development. The role of CA in the tourism development process affects residents' support for tourism activities (Orgaz-Agüera et al., 2022). Conversely, in the works of Gursoy et al. (2010) and Choi and Murray (2010), CA has no significant association with support for tourism. Thus, this study hypothesizes the following as presented in the conceptual framework (Figure 1):

H7. Community attachment has a positive and significant relationship with support for sustainable lake tourism development

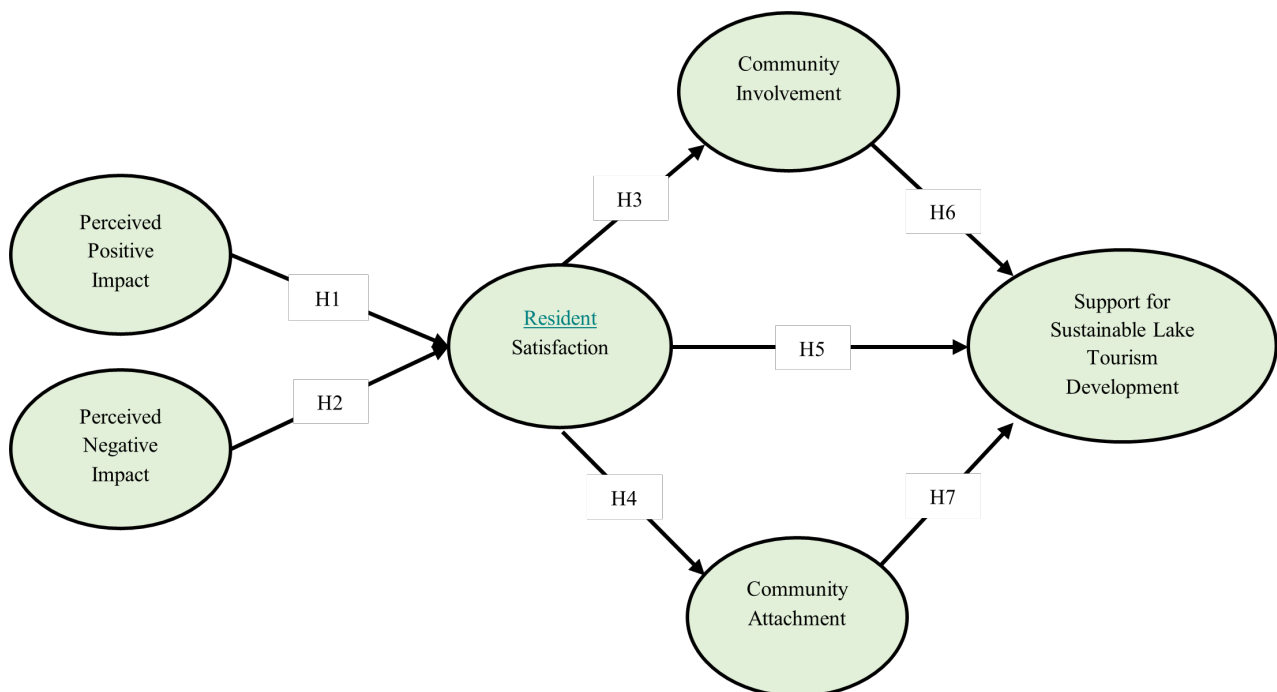


Figure 1. Framework for community support for sustainable lake tourism development.

Methodology

Data Analysis

This study adopts a mixed-methods approach, incorporating both qualitative and quantitative methods. An extensive literature review is conducted to construct a theoretical framework regarding resident satisfaction and support for sustainable lake tourism development. Analyzing existing literature helps identify areas requiring further investigation, and filling gaps in the current knowledge. Subsequently, the study employs partial least squares-structural equation modeling (PLS-SEM), a robust statistical technique for estimating structural models in complex conditions (Henseler et al., 2009). PLS-SEM has gained popularity across various disciplines, including marketing (Hair et al., 2012b), community well-being (da Silva et al., 2024), community engagement (Srivastava et al., 2022). PLS-SEM stages involve identifying inner and outer models (presented in this section), data collection and examination, model estimation, and result evaluation (Hair et al., 2014).

Measurement

The measurement items for each construct in this study were derived from validated measures employed in prior research, as elaborated in supplementary material. Perceived negative impact (PNI) has nine measurement items, perceived positive impact (PPI) has thirteen measurement items, resident satisfaction (RS) has five measurement items, community involvement (CI) has four measurement items, community attachment (CA) has ten measurement items, and support for sustainable lake tourism development (SST) has six measurement items. The survey targeted residents in proximity to Lake Balinsasayao and Lake Danao. Data collection involved face-to-face survey with approximately 350 participants over five days, from February 9 to 14, 2023, in Ormoc and another five days from April 23 to 27, 2023. Data collection yielded 254 responses, with 47 having missing data and 9 displaying a standard deviation of 0. Among the 254 responses, only 198 were considered valid and utilized for the final analysis.

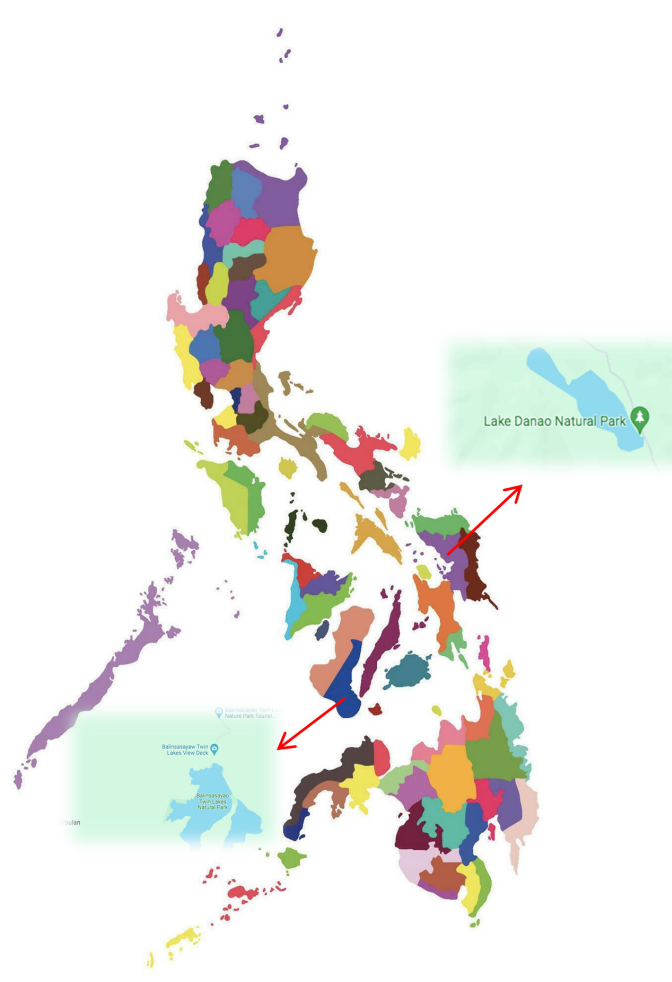


Figure 2. Research location map

Environment

This study was carried out on the lake ecotourism sites of (1) Lake Balinsasayao (Sibulan, Negros Oriental) and (2) Lake Danao (Ormoc, Leyte), as depicted in Figure 2. These two lakes exhibit diverse characteristics, which serve as focal points for the investigation. Lake Balinsasayao and Lake Danao are designated natural parks in the country, falling under the administrative jurisdiction of the Department of Environment and Natural Resources (DENR). They are governed in accordance with Republic Act No. 7586, as amended by the Expanded National Integrated Protected Area System Act of 2018 (RA 11038), under Proclamation No. 1155 dated February 3, 1998, along with their implementing rules and regulations.

Survey instrument

A semi-structured questionnaire incorporating measurement items from relevant literature was crafted as the data collection tool. An exhaustive literature review identified factors influencing resident satisfaction and support for sustainable tourism development, forming the basis for the instrument. The proposed model's variables were aligned with previously validated measurement items. Utilizing a 7-point Likert scale, ranging from 7 (strongly agree) to 1 (strongly disagree), helped mitigate personal bias. The survey questionnaire was randomly distributed to residents living near the lakes, with enumerators aiding in dissemination. A pre-test was conducted to assess the instrument's appropriateness, wherein respondents evaluated the items on the initial design. This study engaged residents from identified lake tourism sites, excluding operators. Respondents aged 18 and above, residing near the lakes (i.e., Lake Danao or Lake Balinsasayao) for at least five years and not involved in tourism operations, were randomly sampled. The survey, personally distributed, ensured privacy, and a pre-test validated instrument efficiency and clarity.

Sampling and data collection

The widely adopted method for determining the minimum sample size in PLS-SEM is the '10-times rule' (Hair et al., 2011; Peng & Lai, 2012). According to this rule, the minimum sample size for PLS-SEM should ideally be ten times the maximum number of arrows directed toward the latent variable in the PLS path model (Hair et al., 2021). This study placed utmost importance on treating research respondents with respect and dignity, prioritizing their protection, and avoiding using offensive language. Participation

was voluntary, with full consent obtained, and privacy was carefully maintained. Ethical principles, including transparency, acknowledgment of authors, and objectivity, were strictly adhered to, ensuring diversity in engagement with directly affected individuals and groups.

Results

Respondent Profile

Most residents are female (61.54%) and have been residing in the areas near the lakes (i.e., Lake Danao or Lake Balinsasayao) for over 20 years (72.596%). The age of the respondents range between 25 and 34 years old. Most residents have completed their high school education (41.83%), while a significant portion pursued some degree in college (31.25%). Furthermore, they are self-employed (30.288%) with an income of less than PhP 9,520 (74.519%).

Test of Measurement Model

The PLS-SEM analysis concurrently examined the outer measurement and inner structural models. The primary assessment criterion for the model involved evaluating the reliability and validity of measures, revealing convergent and reliable indicators. The results of the measurement model assessment demonstrated that all indicators were convergent and reliable, Table 1. Factor loadings exceeding 0.70 were deemed acceptable, excluding ten item indicators as bolded in Table 1 (CA1, CA2, CA3, CA4, CA5, CA10, PPI5, PPI6, PPI7, and PPI8). Employing the SMARTPLS algorithm version 4.1.0.0, this process retained 37 of the 47 measurement indicators for the final analysis. All constructs demonstrated appropriate convergent validity (AVE: 0.587 to 0.825) and reliability, surpassing the 0.70 threshold for both Cronbach's alpha (α) and composite reliability (CR) (Hair et al., 2017). Specifically, Cronbach's alpha values ranged from 0.892 to 0.975, and CR values ranged from 0.921 to 0.977, indicating satisfactory to good reliability within the 0.70 to 0.95 range (Hair et al., 2014). Overall, the analysis confirmed the high reliability of all constructs, underscoring the robustness of the measurement model.

Table 1. Measurement model assessment results.

Item	Loadings	α	CR	AVE	Item	Loadings	α	CR	AVE
CA1	0.398	0.921	0.944	0.808	PPI1	0.754	0.912	0.921	0.587
CA10	0.679				PPI10	0.782			
CA2	0.568				PPI11	0.705			
CA3	0.571				PPI12	0.741			
CA4	0.526				PPI13	0.792			
CA5	0.597				PPI14	0.725			
CA6	0.724				PPI2	0.79			
CA7	0.78				PPI3	0.734			
CA8	0.782				PPI4	0.767			
CA9	0.762				PPI5	0.658			
CI1	0.905	0.927	0.948	0.821	PPI6	0.543	0.892	0.952	0.701
CI2	0.914				PPI7	0.595			
CI3	0.904				PPI8	0.66			
CI4	0.901				RS1	0.75			
PNI1	0.882	0.975	0.977	0.825	RS2	0.846			
PNI2	0.919				RS3	0.853			
PNI3	0.936				RS4	0.884			
PNI4	0.957				RS5	0.846			
PNI5	0.937				SST1	0.741	0.938	0.94	0.767
PNI6	0.937				SST2	0.927			
PNI7	0.921				SST3	0.869			
PNI8	0.93				SST4	0.912			
PNI9	0.738				SST5	0.886			
					SST6	0.908			

Note: α = Cronbach's alpha; CR= composite reliability; AVE= average variance extracted; CA= community attachment; CI= community involvement; PNI=perceived negative impact; PPI=perceived positive impact; RS=resident satisfaction; SST=support for sustainable lake tourism development.

The constructs demonstrated discriminant validity, as the Average Variance Extracted (AVE) exceeded the squared correlation of latent variables (Fornell & Larcker, 1981). In Table 2, bolded square-roots of AVE and non-bolded intercorrelation values verified Fornell and Larcker's condition. Furthermore, the PLS algorithm results in Table 3 confirmed no discriminant validity issues, with all Heterotrait-Monotrait (HTMT) values below the upper threshold of 0.95 or less than 1.00 (Henseler et al., 2015).

Table 2. Fornell and Larcker results.

	CA	CI	PPI	PNI	RS	SST
CA	0.899					
CI	0.554	0.906				
PPI	0.208	0.124	0.766			
PNI	-0.095	-0.461	0.072	0.909		
RS	0.191	0.369	0.533	-0.161	0.837	
SST	0.251	0.468	0.366	-0.318	0.524	0.876

Note: The square-root of AVE is shown on the diagonal of the matrix in bold; inter-construct correlation is shown off the diagonal.

Table 3. Heterotrait-monotrait ratio of correlations results.

	CA	CI	PPI	PNI	RS	SST
CA						
CI	0.599					
PPI	0.224	0.139				
PNI	0.103	0.471	0.117			
RS	0.21	0.403	0.58	0.136		
SST	0.266	0.495	0.39	0.314	0.565	

Test of the Structural Model

This work investigated the predictive capability of the model's endogenous variables (Sarstedt et al., 2014). The primary criteria for evaluating the structural model in PLS-SEM are the strength of path coefficients, R² values (prediction power), and f² (effect size) (Hair et al., 2017). Six of the hypotheses (H1, H2, H3, H4, H5, H6) were supported, and one hypothesis (H7) was rejected. The result was summarized in Table 4 and presented in the model in Figure 3.

The threshold values for the coefficient of determination (R²), as defined by Henseler et al. (2009) and Hair et al. (2011), are 0.75 for substantial, 0.50 for moderate, and 0.25 for modest levels of prediction accuracy. In this investigation, Figure 4 illustrates the R² values, providing insights into the predictive accuracy of the structural model.

SST demonstrated the highest explained variance with an R² value of 0.363 (36%), while RS showed a moderate prediction accuracy of 0.324 (25%). CI showed a modest prediction accuracy with an R² value of 0.136 (14%), while CA showed a negligible prediction accuracy with an R² value of 0.037 (3%). The effect size (f²) values, evaluated using the PLS algorithm, represent 0.02 (minor), 0.15 (medium), and 0.35 (substantial) effects on the relationship between exogenous and endogenous constructs (Hair et al., 2017). Furthermore, a value below 0.02 indicates no effect of exogenous constructs on an endogenous construct. In this study, the f² results reveal a substantial effect of PPI on RS (f²= 0.441), whereas PNI has a minor effect on RS (f²=0.059). RS has a minor effect on CA (f²=0.038), a medium effect on CI (f²=0.158), and a substantial effect on SST (f²=0.224). These findings align with the broader outcomes of the study.

Table 4. Path analysis results.

	β	p values	Decision
H1: Perceived positive impact → resident satisfaction	0.547	0.000***	Supported
H2: Perceived negative impact → resident satisfaction	-0.2	0.058 ns	Supported
H3: Resident _satisfaction → Community involvement	0.369	0.000***	Supported
H4: Resident _satisfaction → Community attachment	0.191	0.024*	Supported
H5: Resident _satisfaction → Support for sustainable lake tourism development	0.407	0.000***	Supported
H6: Community involvement → Support for sustainable lake tourism development	0.32	0.000***	Supported
H7: Community attachment → Support for sustainable lake tourism development	-0.004	0.952ns	Not Supported

Note: *** $P \leq 0.001$; ** $P \leq 0.01$; * $P \leq 0.05$; ns not significant.

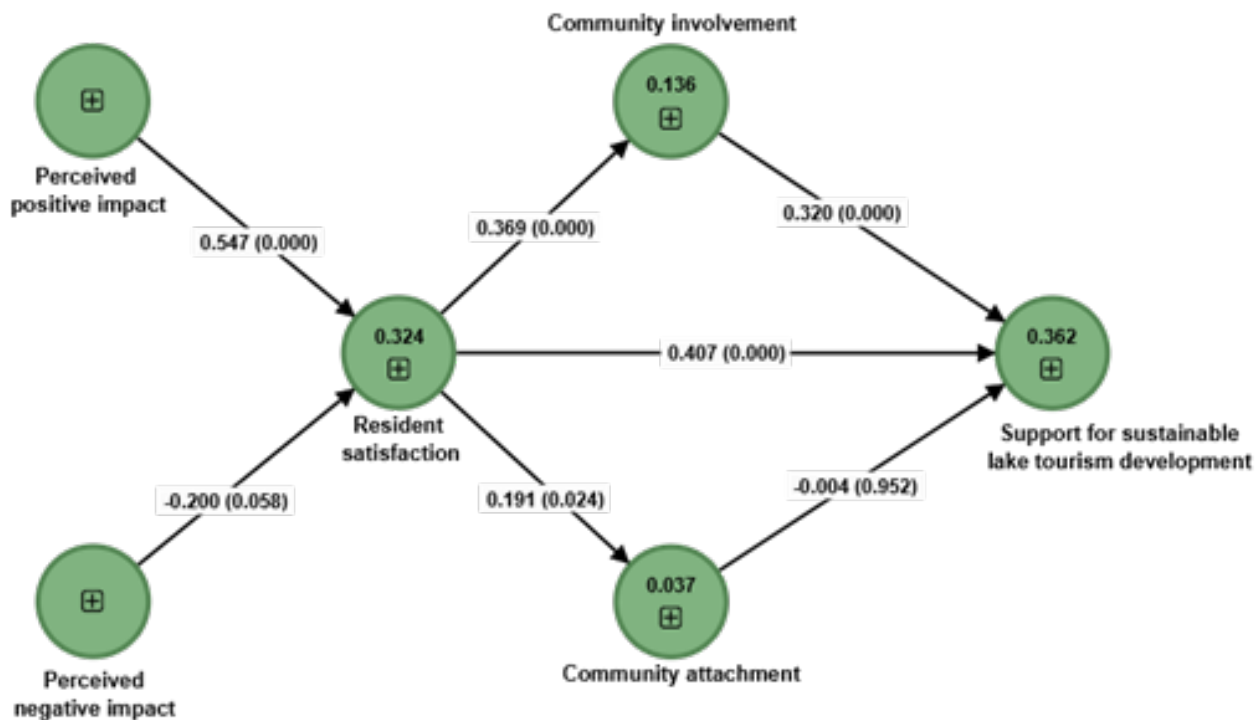


Figure 3. Structural Model results.

Discussion

The perceived positive impacts (PPI) of tourism are significantly associated with residents' satisfaction (RS), supporting H1. Residents' satisfaction with sustainable lake tourism development is influenced by PPI, which is evident in local economic opportunities, infrastructure, cultural exchanges, and environmental protection stemming from tourism (Theobald, 2012; Kim & Park, 2017). These tourism-related benefits promote a sense of well-being and satisfaction among residents. When

residents witness these tangible advantages, they tend to view tourism more favorably, recognizing its positive impact on their quality of life within the community. On the other hand, residents' perceived negative impact (PNI) of tourism has a negative but significant relationship with residents' satisfaction supporting H2. The PNI of tourism, including environmental degradation, overcrowding, and increased crime rates, significantly reduce residents' satisfaction with their community by adversely affecting their quality of life and sense of well-being. Residents may resent further tourism development

due to their PNI, which may include increased cost of living, overcrowding, and environmental degradation, among others. The residents' resentment towards tourism development could reduce their pride, belonging, and attachment to the community. Furthermore, community involvement (CI) is associated with supporting sustainable lake tourism development in H3. Residents may gain a high sense of ownership and control over their community's development and well-being when they actively participate in sustainable lake tourism activities, decision-making processes, and initiatives. Involved residents may invest more on their community's well-being, which may warrant their support for sustainable lake tourism development and initiatives. CI also ensures that local concerns and priorities of the residents are heard and addressed.

Resident satisfaction is also linked with community attachment, thus supporting H4. When residents experience satisfaction with various aspects of their community, such as safety, infrastructure, and social connections, they cultivate positive emotions like pride, comfort, and contentment. This, in turn, strengthens their community attachment as their needs are fulfilled. Residents with a sense of belongingness, identity, and fulfillment within the community are more linked with strong attachment and loyalty to the community. Residents' satisfaction (RS) is linked to their support for lake tourism development supporting H5. The RS is the level of contentment with the tourism development activities in their community. Satisfied residents are more likely to value and preserve their environment and contribute to the lake's sustainability and long-term attractiveness for tourists. Satisfied residents often have a community sense of pride and ownership, and actively participate in supporting tourism activities by collaborating with concerned stakeholders. Satisfied residents feel valued, engaged, and fulfilled within the community's social fabric and develop a sense of purpose.

Community involvement (CI) is linked with residents' support for lake tourism development supporting H6. Residents who actively participate in the decision-making processes and initiatives related to sustainable lake tourism development are more likely to feel a sense of concern for the goals of such initiatives. CI facilitates communication and collaboration between residents, local authorities, and tourism stakeholders that builds trust, raises consensus, and strengthens support for lake tourism development within the community. Community attachment (CA) is found to have a negative and

insignificant link with support for lake tourism development supporting H7. The unexpected finding may stem from, first, residents may be more attached to other aspects of their community. For instance, residents with a strong commitment to the natural environment may be more concerned about the possible environmental consequences of tourism growth on the lake ecosystems, prompting them to withdraw their support. Second, residents who are deeply attached to their community may perceive lake tourism development as a threat to community identity and as a potential cause of overdevelopment. Lastly, the residents' negative perceptions of tourism-related governance or decision-making processes reduce residents' support of sustainable lake tourism development regardless of their level of community attachment. Residents who feel excluded from decision-making processes, perceive a lack of transparency or responsiveness from local authorities, or have had negative experiences with previous development projects may be less likely to support new tourism initiatives.

Policy Implications

This study put forward various measures to enhance resident support for sustainable lake tourism development through participatory policies, resident education, incentives, and strict implementation of environmental policies. First, participatory policies for community engagement and empowerment should be properly implemented by involving residents in offering local products and tourism services with sustainable lake tourism development. Local governments and lake tourism site managers may focus on residents' involvement in decision-making, soliciting feedback on proposed initiatives, and actively seeking inputs on lake development plans. Establishing advisory committees, community forums through community-based organizations (e.g., people's organizations), and consultations dedicated to sustainable lake tourism development may be beneficial. These forms of dialogue and involvement promote a sense of ownership within the community by providing residents a platform to share their opinions, concerns, and ideas. Through proactive involvement, residents could identify potential challenges, such as environmental degradation, congestion, or cultural disruption, and work with relevant stakeholders to develop sustainable and responsible tourism practices. Residents' active involvement in tourism planning ensures alignment with community values. This collaborative approach builds trust, increases consensus, and strengthens community support

for lake tourism development.

Second, education and awareness should be provided to the residents. Community involvement in tourism is challenged due to a lack of crucial industry-related knowledge and skills. Local governments and lake tourism site managers have involved and capitalized on residents in delivering tourism products and services. Nevertheless, there remains a necessity to provide training for these residents. Thus, there is a need to develop educational programs and awareness campaigns to educate residents. One of the most viable initiatives is the government-academe partnership, which may be beneficial in educating residents about sustainable lake tourism development and creating resident awareness on (1) the value of tourism to the community (e.g., economic, socio-cultural, and environmental) and (2) skills training such as customer service, tour guide, food and beverage skills, basic culinary skills to enhance tourism product and service delivery in lake tourism sites. By increasing awareness and promoting dialogue about the complexities of lake tourism development, policymakers could gain support for sustainable and responsible initiatives that align with community values.

Moreover, offering skills training programs for residents interested in working in the tourism sector could improve their satisfaction, involvement, attachment, and support for sustainable lake tourism development. However, community involvement is also challenged by the seasonal and part-time nature of available jobs in lake tourism sites, coupled with low pay, which hinders some residents from participating in tourism activities. There is a need to promote community-driven initiatives and small-scale enterprises at the grassroots level. Thus, providing education and support to residents that encourages entrepreneurial activities to develop tourism-related businesses, including mentoring, funding, and marketing assistance, creates opportunities for residents. *Thirdly*, to promote entrepreneurial activities, there is a need to incentivize community involvement. Introducing policies that provide economic incentives for residents that engage in tourism activities is crucial. These include financial support through tax incentives, easy access to microfinance programs, and grants for community-led initiatives. Though these are already offered locally, they remain underutilized due to residents' lack of awareness and intimidation. Equitable distribution of tourism revenues among residents should be ensured, incorporating mechanisms like revenue sharing, directing funds to community projects, and

implementing transparent distribution systems. Such policies benefit individuals directly involved in tourism and contribute to community well-being (e.g., improved infrastructure and public services). Community involvement is crucial in addressing potential concerns and mitigating adverse impacts associated with tourism development. Thus, local governments may create revenue-sharing frameworks to distribute lake tourism sites' revenues among stakeholders that will promote equity and support conservation. They include direct payments, agreements, community-based enterprises, ecotourism concessions, payment for ecosystem services, and trust funds. These mechanisms incentivize sustainable management and community participation.

Fourth, community organizations are present in lake sites. However, the residents' internal conflicts and lack of direction impede tourism growth. Internal conflicts within the community manifest in various forms, such as disagreements over resource allocation, decision-making processes, or conflicting goals. To fully capitalize on the potential of lake tourism sites, addressing internal issues and offering direction and assistance to these community organizations is crucial. Interventions aimed at promoting consensus-building, communication, and conflict resolution among locals can help reduce tensions and have a more cooperative environment that is favorable to tourism development. Thus, intervention in this matter must be taken into consideration. Community organizations compete with one another, but it is crucial for them to aim to complement rather than compete. *Lastly*, strong implementation of environmental policies, especially for lake tourism sites, especially in sites that the NIPAS Act does not protect. The strong implementation of policies such as the Clean Water Act, regulations set by the National Water Resources Board (NWRB), and the National Environmental Impact Assessment System (NEIAS) is crucial for safeguarding lakes by controlling pollution, managing watersheds, and conducting environmental impact assessments. It was observed that there are pigpens near the lake, which affects its water quality. Several policies and initiatives in the Philippines, such as the National Ecotourism Strategy, Republic Act 9593 (Tourism Act of 2009), and sustainable tourism certification programs, provide a framework for promoting sustainable tourism and ecotourism practices in lake tourism sites. These measures integrate environmental protection, community participation, and cultural preservation into tourism development plans, ensuring natural and cultural

heritage conservation and protection. Implications are summarized in supplementary document B.

Conclusion

The study intends to enhance the understanding of resident satisfaction with sustainable lake tourism development and its implications for their support of such initiatives. The study focused on the association of perceived positive and negative impacts of tourism with resident satisfaction and their satisfaction with community involvement, community attachment, and support for sustainable lake tourism development using Partial Least Squares Structural Equation Modeling. (PLS-SEM) The study demonstrates a significant relationship between the perceived positive impacts of tourism and residents' satisfaction, and residents perceived negative impacts of tourism have a negative and substantial relationship to satisfaction with sustainable lake tourism development in their community. The study affirms that residents' satisfaction is positively associated with community involvement, community attachment, and residents' support for lake tourism development. Additionally, community involvement is related to their support for sustainable lake tourism development. However, community attachment has no association with their support for sustainable lake tourism development.

Future works may incorporate a sustainability prism framework that considers environmental, economic, socio-cultural, and institutional dimensions to explore their relationship with resident satisfaction on lake tourism development. Additionally, exploring the relationship between resident empowerment, community citizenship behavior, and satisfaction can provide valuable insights into the factors that motivate support for sustainable tourism initiatives. This work puts forward some limitations. The success and challenges in one lake community may offer valuable insights and lessons applicable to similar contexts. Research across multiple lake communities can enrich our understanding of the diverse socio-economic, environmental, and cultural factors affecting tourism to put forward more robust and contextually relevant policy insights.

Funding

This research was funded by the National Research Council of the Philippines under the NRCP Science and Technology Experts' Pool.

Declaration of Conflict of Interest

There are no financial or non-financial competing interests to be declared.

Author Contributions

Kafferine D. Yamagishi: Conceptualization, Supervision, Methodology, Formal analysis, Investigation, Writing-Original draft, Writing – Review & Editing, Visualization, Project administration.
Lanndon A. Ocampo: Formal analysis, Investigation, Writing – Review & Editing.

Ethics Statement

This study have been granted approval by the Cebu Technological University UREC for implementation (UREC Protocol No. 01-2022-016). Informed consent was obtained from all participants prior to their involvement in the study, and measures were taken to ensure confidentiality and privacy. Any potential conflicts of interest have been disclosed.

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Supplementary material. List of constructs with measurement indicators and sources.

Perceived Positive Impacts (PPI)	PPI1. Increase job opportunities in the community	Chow et al. 2019
	PPI2. Help to boost the local economy	
	PPI3. Provide alternative livelihood options when other livelihood activities (e.g. fishing) have declined	
	PPI4. Make goods and services in the lake community more diverse	
	PPI5. Raise public awareness of the importance of environmental protection.	
	PPI6. Help to preserve lakes.	
	PPI7. Decrease noise pollution.	
	PPI8. Help to protect the flora and fauna in the region.	
	PPI9. Improve the basic infrastructure of the community.	
	PPI10. Help to preserve historic buildings.	
	PPI11. Help to promote cultural activities to outsiders.	
	PPI12. Increase the popularity of cultural activities among local residents.	
	PPI13. Attract local residents who left the lake community to move back.	

Perceived Negative Impacts (PNI)	PNI1. Increase air pollution	Chow et al. 2019
	PNI2. Increase water pollution	
	PNI3. Worsen environmental hygiene	
	PNI4. Increase solid-waste pollution	
	PNI5. Construction of tourism facilities has a negative impact on the landscape	
	PNI6. Increase community overcrowding	
	PNI7. Increase the crime rate	
	PNI8. Increase conflicts among residents in daily life	

Resident Satisfaction (RS)	RS1. I can influence tourism development at this site	Hussain, 2015
	RS2. Tourism in this site benefits me	
	RS3. It is important to have sustainable tourism in this site	
	RS4. The attractiveness of the area has been improved because of tourism	
	RS5. My quality of life has improved because of tourism	

Community Attachment (CA)	CA1. The settings and facilities provided by this community are the best	Kyle et al. (2004); Yüksel et al. (2010); Lee (2013)
	CA2. I prefer living in this community over other communities	
	CA3. I enjoy living in this community more than other communities	
	CA4. I identify the living in this community	
	CA5. I feel that this community is a part of me	
	CA6. Living in this community says a lot about who I am	
	CA7. Living in this community means a lot to me	
	CA8. I am very attached to this community	
	CA9. I feel a strong sense of belonging to this community	
	CA10. Many of my friends/family prefer this community over other communities	
Community Involvement (CI)	CI1. I am involved in decision-making about tourism planning and development	Nicholas et al. (2009) and Tosun (2006).
	CI2. I am involved in the management of tourism	
	CI3. I am involved in decision-making about tourism development and preservation	
	CI4. I have the opportunity to participate in tourism planning and development in the future	
Support for Sustainable Tourism (SST)	SST1. I support the development of community-based sustainable tourism initiatives	Nicholas et al. (2009)
	SST2. I participate in sustainable tourism-related plans and development	
	SST3. I participate in cultural exchanges between local residents and visitors	
	SST4. I cooperate with tourism planning and development initiatives	
	SST5. I obey regulatory environmental standards to reduce the negative effects of tourism	
	SST6. I participate in the promotion of environmental education and conservation	