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Sustainable tourism development and potential implications for the tourism sector in the Vietnamese Mekong delta in the context of climate change

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Abstract:

Mekong delta is one of the most vulnerable delta in the world to climate change. Tourism is the rising economic sector in the region and is expected as one of the sectors to contribute much to the process of economic transformation and integration. However, this sector suffers from the climate-changing process due to its impacts on tourism resources, tourism products, and tourism infrastructures. This paper aims to provide a comprehensive literature review of ongoing research on the concept and application of sustainable tourism development and climate change in the Vietnamese Mekong delta. The research discusses the literature on the concept of sustainable tourism development and offers an in-depth evaluation of the correlation between tourism and climate change in the area. In reality, there is insufficient strategic planning for the tourism industry in the context of climate change. Sustainable tourism development is recommended as a vital approach for the regional tourism sector, offering long-term adaptation to climate change in the context of the Mekong delta.

Keywords: **climate change, Mekong delta, sustainable development, tourism.**

Classification number: **7**

1. Introduction

The concept of sustainable tourism development has been used as an important principle and an effective tool to manage numerous tourism destinations around the world. The primary purpose of this tool is to provide methods to amplify positive impacts and reduce negative ones in tourism development.

Despite receiving much attention from academics [1-5], managers, and planners, the concept of sustainable tourism development remains under debate. This is due to the numerous approaches and ways in which sustainability can be theorised and implemented. C.M. Hall (1998) [6] has highlighted that the main aim of sustainability is to protect livelihoods, culture, society, and the environment. To achieve this aim, sustainable development requires the involvement of all stakeholders and strategic planning [7]. From this definition alone, it becomes evident that sustainable development is a multifaceted and expansive concept encompassing many dimensions of human life.

Parallel to the concept of sustainable development, the more specific embodiment of the sustainable tourism development concept also continues to undergo a period of debate and assessment. R. MacLellan (1997) [8] has observed that although there is a consensus regarding the contribution of sustainable tourism development at macro levels, there is no universal agreement on what the term 'sustainable tourism development' precisely signifies. This ambiguity stems from the fact that sustainability is a multifarious, elusive, and occasionally nebulous concept [9-11]. Such ambiguity arises because people's perceptions differ based on various local contexts, leading them to adopt different principles of sustainable tourism development to shape their perspectives. As a result, numerous authors have proposed their individual nuanced definitions of sustainable tourism development [12-14]. Even though from

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the aforementioned definition, sustainable tourism development seems to lack a consistent direction, nearly all approaches share the common objective of elucidating how to effectively implement sustainable tourism development [11]. B. Garrod, et al. (1998) [15] posited that sustainable tourism development will not achieve its objectives unless tangible results can be observed. In general, sustainable tourism development is a broad concept with a variety of literature presenting a wide array of sustainable tourism development models.

The most widely accepted definition of sustainable tourism development is from the World Tourism Organization (WTO). In their report 'Guide for Local Authorities on Developing Sustainable Tourism', the WTO stated that sustainable tourism development aims to:

... *"Meets the needs of present tourists and host regions while protecting and enhancing opportunities for the future. It is envisaged as leading to the management of all resources in such a way that economic, social, and aesthetic needs can be fulfilled while maintaining cultural integrity, essential ecological processes, biological diversity, and life support systems*" [16].

This definition is used as a guideline and a foundational background for almost all tourism projects with respect to sustainable development criteria.

Although there are many variations in understanding the meaning of sustainable tourism development, there has been a broad consensus in establishing its principles. The ultimate purpose of sustainable tourism development is to shield future generations from mass tourism development [17], with all the negative social, cultural, and environmental implications such a prospect brings. Therefore, sustainable tourism development is often understood based on three aspects termed the "Triple Bottom Line", referring to social, environmental, and economic outputs and goals [18]. The "Triple Bottom Line" suggests that tourism in a destination is sustainable when: 1) it enhances the quality of the local community, 2) it satisfies customers, and 3) it safeguards the environment.

To concretise the "Triple Bottom Line", The United Nations (UN) has proposed 18 core principles for sustainability [19]. These principles cover a vast spectrum of sustainability through social, economic, and environmental facets, and many of these highlight the crucial role of strategic planning and stakeholder participation in the success of sustainable tourism development projects. This implies that strategic planning and stakeholder participation is pivotal and a fundamental prerequisite for the realisation of sustainable tourism development [20].

Regarding sustainable tourism development planning, there are various approaches, including economic, physical, environmental, and community perspectives. Given that economic development is urgent and much more apparent, especially in developing economies, the economic approach traditionally dominates nearly all sustainable tourism development projects [21]. Somewhat perilous for culture and the environment, the economic returns of tourism activities frequently guide the decision-making process in many instances of tourism planning. Consequently, when implementing the economic approach in tourism planning, it often results in adverse effects on tourism activities as well as on society and the environment [22].

Acknowledging the essential role of strategic planning in the sustainable tourism development process, the WTO (1984) [23] has argued that its absence could lead to the failure of sustainable tourism development. The mission of strategic planning is to clarify every step of the sustainability process before it is executed. This includes ensuring that all primary resources are safeguarded for the future, and that environmental, social, and economic issues are addressed resources are protected for the future; and environmental, social, economic issues are addressed [12]. Strategic planning in sustainable tourism development provides a framework for policymakers, ensuring that tourism development contributes to the benefit of all stakeholders [24]. B. Faulkner (2002) [25] recommended the destination strategic management and planning model, which underscores that community participation, a comprehensive destination approach, and collaboration are core factors for a sustainable tourism development initiative.

C.M. Hall (2008) [26] posits that strategic planning, as part of the concept of sustainable tourism planning and development, seeks to achieve three objectives: 1) conservation of tourism resources;

2) enhancement of the visitor experience; and 3) maximisation of economic, social, and environmental benefits for stakeholders. The process hinges on physical development, incorporating a tourism destination action plan, objectives and outcomes based on that action plan, and a planning approach that evaluates the effects of tourism activities in the present and future environment. To address climate change, conserving tourism resources in this model would be the primary objective of any tourism planning project.

A number of authors such as R. Welford, et al. (2004) [17], P.E. Murphy (1988) [22], and J. Sadler (2004) [27] concur that stakeholder participation in the sustainable tourism development process is both necessary and crucial. The involvement of stakeholders ensures that the process progresses in the desired direction while adhering to the boundaries of development and conservation. Moreover, a sustainable tourism development process cannot achieve its objectives if it overlooks the needs of local communities [28]. This observation further underscores the pivotal role of stakeholders, especially the local community. Local community engagement and the benefits derived from it constitute the primary rationale, incentive, and outcome of involvement in sustainable tourism development. It's imperative to consider the viewpoints of host communities in sustainable tourism development, and there is an escalating emphasis on understanding the socio-cultural impacts of climate change at the grassroots level [29]. Given the current imperative that sustainable tourism development must align with climate change adaptation, community studies are increasingly crucial. Such studies significantly contribute to climate change research and can illuminate the well-being of local populations, thereby reinforcing the need for more investigation into the interplay between local governance, global climate change, and tourism [30-32]. Additionally, community participation is a crucial criterion for sustainable tourism [29]. Thus, alongside the government and business entities, local communities represent the third vital stakeholder in sustainable tourism development. In a participatory paradigm, the dynamic between these three stakeholders should manifest as collaboration or cooperation [33]. Stakeholder engagement in the sustainable tourism development process can help chart the course for future destination development [34].

Tourism contributes to 8% of carbon dioxide emissions worldwide [35]. Simultaneously, this industry is perceived as being particularly sensitive to the anticipated effects of climate change [36, 37]. This sensitivity renders tourism-dependent communities vulnerable to global climate change and its local consequences [29]. As a result, the importance of sustainable tourism has never been greater. Various standards for future sustainable tourism have been proposed, offering key environmental indicators for the tourism industry, such as climate change mitigation, pollution reduction, the use of renewables, and waste disposal, among others [1, 38].

Given the forecasted impacts of climate change and the vulnerability of the tourism sector, along with its associated social systems, there is a pressing need for research into and the formulation of strategies and policies for adaptation. Despite the critical nature of adapting to climate change, the tourism industry still does not fully comprehend this imperative [39, 40].

This article offers a comprehensive literature review of ongoing research on the concept and application of sustainable tourism development and climate change in the Mekong delta, Vietnam. In this region, tourism is burgeoning, yet it faces the escalating challenges of climate change. Within the Vietnamese Mekong delta context, sustainable tourism development is not only encouraged but is also seen as a vital approach to long-term adaptation to climate change in the regional tourism sector.

2. The Vietnamese Mekong delta and climate change consequences

The Mekong delta region in Vietnam spans a geographical area of about 40,000 km², bordered by Ho Chi Minh city to the north and Ca Mau province to the south. The Vietnamese Mekong delta is bordered by the sea on three sides with a coastline of over 736 km [41]. The region comprises 12 provinces and one city. Its tropical climate facilitates the production of unique tropical agricultural products for Vietnam. The area is known for producing tropical fruits such as mango (*Mangifera indica*), rambutan (*Nephelium lappaceum*), longan (*Dimocarpus longan*), and others. Moreover, the dense river system and the

conducive environment have fostered the evolution of unique cultural assets, both in terms of settlements and economic progression.

The Mekong delta in Vietnam boasts a typical tropical climate with an average temperature of 28°C, humidity surpassing 80%, and high rainfall [41]. These conditions are ideal for food production, especially rice and various fruits. While the region faces fewer impacts from extreme weather events such as storms compared to other parts of the country, the prolonged rainy season can adversely affect outdoor tourism activities, undermining its potential as a significant revenue source. Generally, the climatic conditions in the delta are favourable for tourism, with ten out of twelve months deemed suitable for tourist activities.

The Mekong delta has an extensive river network with canals totalling about 28,000 km. The Mekong River in Vietnam splits into two primary channels: the Upper and the Lower. Recent climate change and the construction of hydropower plants, however, have considerably affected the region's river system. Climate change has caused variations in annual rainfall, altering the regular water flow of the Mekong river. Additionally, the construction of hydropower plants upstream obstructs water flow and disrupts the river's natural progression. The delta's terrain is relatively flat and low, averaging a height of just +1 m [42]. This includes both the Upper and Lower delta. While the upper region grapples with floods, the lower region faces the threat of rising sea levels. This makes the delta susceptible to multifaceted changes in the water table.

Predominantly agriculture-based, the Mekong delta contributes fifty percent of Vietnam's rice and seventy percent of its fruit production. Ninety percent of the country's rice exports and sixty percent of its fish exports originate from this region [43]. Due to its agricultural bounty, the delta's GDP has been growing annually by 7.5% to 8.0%.

Numerous studies have been conducted on the ramifications of climate change in the Vietnamese Mekong delta, exploring issues such as rising temperatures, increased rainfall, salinisation, sea level rise, and extreme weather events [44-50].

According to the climate change scenario for 2020 [46]. observational stations have recorded a consistent rise in the Mekong delta area's average temperature over recent years. Under the RCP8.5 scenario, temperatures are projected to increase by 1.7-2.3°C by mid-21st century and by 3.2-4.2°C by the century's end. Annual rainfall is expected to surge by 10-25% by the end of the century, compared to the period from 1986-2005. In a scenario forecasting a sea level rise of 100 cm, 47.29% of the Mekong delta area faces a high flooding risk. The southwest of the delta will be the initial area to bear the brunt of the rising sea levels, followed by the central and other regions. A sea level rise of 100 cm could impact more than 4.7 million people, approximately 27% of the delta's population, leading to frequent displacements. As sea levels continue to ascend, land loss will escalate, propelling the Mekong delta towards a climatic crisis.

3. Tourism development in the Mekong delta

Boasting a wide range of tourist attractions, the Vietnamese Mekong delta region offers a wealth of natural and cultural resources conducive to tourism development. These include natural heritages showcasing the region's biodiversity and cultural heritages spanning several historical epochs. The Mekong River holds significant sway over the tourism resources in the Mekong delta. Its deep-rooted history, intertwined with "water culture" communities reliant on river networks for transport, livelihood, and societal connections, is deemed a unique cultural asset for tourism. This fertile expanse boasts thousands of orchards producing myriad delectable fruits. A convoluted network of rivers, canals, and islets enveloping the delta provides optimal conditions for a multitude of orchards, as well as various conservation and national parks. Additionally, tourists flock to floating markets, numerous pagodas, and temples, among other attractions.

Beyond these tangible attractions, intangible attributes like arts and gastronomy also stand out in the delta's tourism repertoire. The locals' livelihood has transformed into an invaluable cultural asset for tourism. The abundance of pagodas and temples enriches the religious mosaic of this multi-ethnic region. The local culinary scene encapsulates a medley of tastes shaped by centuries of colonial influence and broader Southeast Asian migrations and dominations. Numerous festivals, primarily

centred on religious or agricultural themes, are celebrated annually. "Don Ca Tai Tu", a popular folk song music genre of the delta's inhabitants, has been acclaimed as an intangible cultural heritage of humanity by UNESCO.

The diversity of natural and cultural elements in the Mekong delta has paved the way for an array of tourist destinations. Thirty-six attractions particularly resonate with tourists. Among these, the most prominent hotspots include Can Tho, Ben Tre-Tien Giang, An Giang, Ca Mau, and Kien Giang. Specifically, Can Tho captivates international tourists with its historic edifices and temples, whereas An Giang is a favoured destination for domestic, particularly religious, tourism.

Tourism accounts for roughly 4% of the region's total GDP, marking its ascendancy as an economic sector of substantial significance in the delta. As per the Ministry of Culture-Sport and Tourism, the Mekong delta welcomed 1.8 million international and 10.6 million domestic tourists in 2015, amassing a tourism revenue of nearly 8,500 billion VND (approximately 400 million USD). In 2010, there was a surge in international tourist arrivals by nearly 20%.

In 2022, the Mekong delta hosted 37,504,427 visitors, marking a 238.45% growth compared to the same period in 2021. Estimated tourism revenue for the Mekong delta stands at over 32,087 billion VND, showing a 234.46% increment from the corresponding period in 2021. The aim for 2023 is for the Mekong delta to entertain 46 million visitors [51]. Concurrent with this exponential rise in tourist influx, by 2018, the entire Mekong delta region housed 2,406 accommodation venues offering 55,888 rooms, alongside approximately 2,000 eateries catering to tourists. The workforce directly engaged in the region's tourism sector in 2018 stood at 35,408 individuals [52].

4. Global and Vietnam tourism policy on climate change

To mitigate the adverse effects of climate change, global cooperation has intensified, with concerted efforts to formulate collaborative strategies equipped with effective roadmaps and tools to address these challenges. In 1988, the World Meteorological Organisation (WMO) and the United Nations Environment Programme (UNEP) set up the Intergovernmental Panel on Climate Change (IPCC) to furnish policymakers with consistent scientific evaluations on climate change. The United Nations Framework Convention on Climate Change (UNFCCC) was adopted in 1992. The 1997 Kyoto Protocol and the 2015 Paris Agreement furthered the Convention's cause, with Nationally Determined Contributions, or NDCs, standing as primary response mechanisms to climate change. The most recent event, the COP 26 conference in Glasgow, UK, in 2021, saw nearly 200 countries concur on the Glasgow Climate Pact, committing to a temperature rise limit of 1.5°C and the comprehensive fulfilment of the Paris Agreement.

In 2003, the 1st International Conference on Climate Change and Tourism took place in Tunisia. Its primary objective was to enhance awareness amongst governmental bodies, the tourism sector, and other associated stakeholders. The discussions centred on the immediate and forecasted impacts of climate change on tourist destinations, the implications of climate change mitigation policies on tourism, and the onus on the tourism industry to curtail greenhouse gas emissions [53]. This conference underscored that tourism was likely one of the sectors most susceptible to the repercussions of climate change.

Subsequent to this event, a series of pertinent workshops were convened in Europe with the intention of bridging the gap between tourism stakeholders and scientists, leading to the formation of a dedicated professional group. In 2005, the Expert Team on Climate and Tourism was inaugurated in China under the aegis of the WMO's Commission for Climatology. In the aftermath, an array of guidelines and documents discussing the nexus between climate change and tourism were disseminated. The *Davos Declaration on Tourism and Climate Change* in 2007 [54] emphasised the imperative to delve deeper into the outcomes stemming from the interplay between tourism and climate change, necessitating increased adaptation efforts and emissions curtailment both by tourism businesses and destinations.

Regarded as one of the fastest-growing sectors in the 21st-century global economy, tourism has burgeoned into a pivotal foreign currency generator for myriad global regions [55]. Research, including works by C.M. Hall, et al. (2008) [56] and UNWTO (2007) [57], suggests that tourism offers a viable avenue for poverty reduction, especially in

developing nations. However, tourism is intrinsically tied to the climate, rendering it a sector highly sensitive to climatic fluctuations. As posited by UNWTO, et al. (2008) [54], climate change influences tourism through four principal channels:

1) Direct climate impacts: Extreme weather and climate events could result in damage to infrastructure, an increase in disaster preparedness needs, heightened operational costs, and business interruptions.

2) Indirect environmental change impacts: The environment is a primary resource for tourism. Environmental changes lead to alterations in ecosystems, water availability, and agricultural production.

3) Impacts of mitigation policies on tourist mobility: National or international climate mitigation policies could impact tourist flows. Transport and service costs may rise owing to the expenses associated with environmental protection.

4) Indirect societal change impacts: Climate change may diminish the GDP and wealth of populations, leading to decreased demand for tourism activities.

Conversely, tourism also contributes to climate change. The CO_2 emissions from tourism activities, such as transport, accommodation, and entertainment, account for about 8% of the total global emissions [35]. M.C. Simpson, et al. (2008) [53] maintained that significant research on tourism and climate change was conducted in the 2000s. In particular reports by the IPCC Working Group on Impacts, Adaptation, and Vulnerability, the tourism industry has been a central concern. However, "*Knowledge of the capacity of current climate adaptations utilized by the tourism sector to cope successfully with future climate change is currently very limited*" [54]. Although knowledge has enhanced, it appears that little has transformed in tourism practice [58]. A discernible gap exists between theory and practice in the tourism stakeholders' approaches to climate change risk management and related policy development. This gap manifests as a deficiency in tourism development strategies that account for specific aspects of climate change, with escalating risks pertaining to access or tourism operations [29]. Existing literature regarding the impact of climate change on tourism [59-61] reveals a low level of awareness among tourism operators and policymakers and a dearth of long-term strategic planning on these intricate issues. The UNWTO, et al. (2008) [54] highlight that present-day tourism activities, destinations, and tourist flows might endure long-term repercussions from climate change and possess a limited capacity to adapt. The tourism industry must learn to acclimatise to the effects of climate change [62, 63], as it is projected that tourism businesses and destinations will confront more severe changes in the future [64, 65]. Research on tourism and climate change has centred on both mitigation and adaptation challenges, transitioning from reactive measures to a more proactive stance and aligning closely with disaster risk management, given that various facets of climate change may hinder sustainable development [29]. Mitigating and adapting to climate change necessitates technological, economic, and societal shifts, particularly through behavioural change [66]. The tourism sector can bolster climate change adaptation by integrating advanced technologies and methodologies into its operations and by heightening stakeholder awareness toward more sustainable production.

Currently, there are gaps in understanding how to address and moderate the effects of climate change, especially in developing nations and small islands. The relationship between tourism and climate change is less understood in the developing world than in nations with longer-established tourism histories. However, emerging tourism issues in these areas are among the most vulnerable to climate change. As R.V. Cruz, et al. (2007) [67] noted: "*Nature-based tourism is one of the booming industries in Asia, especially ski resorts, beach resorts and ecotourism destinations which are likely vulnerable to climate change; yet only a few assessment studies are on hand for this review*".

One of the most significant challenges in conducting research on tourism and climate change is that the direct and indirect impacts of climate change on tourism vary by location [68]. Isolating the directly observable impacts of climate change on tourism is challenging [69]. According to the UNWTO, et al. (2008) [54], South East Asian tourism is a vulnerable hotspot for increased extreme events, marine biodiversity loss, sea level rise, and an increased risk of disease outbreaks. However, this information is only available on a broad scale. As a result, there is a call for the development of local

knowledge capacities to fill this research gap [70]. This research project aims to address such calls for regional-scale analyses of climate change impacts on tourism.

Vietnam is among the countries facing the adverse impacts of climate change globally and is focused on developing policies and strategies to address these issues. The Vietnamese Government's Resolution No. 60/2007/NQ-CP dated 3rd December 2007 [71] and the National Target Program to Respond to Climate Change [48] have developed a strategy for addressing Vietnam's climate change concerns, proposing an eight-step climate change response. This research emphasises evaluating the impacts of climate change, raising public awareness, and adapting to the climate as primary responsibilities in responding to climate change. The government's call-to-action is one of the primary policies and serves as a starting point for this paper.

The Vietnam Ministry of Natural Resources and Environment has conducted a preliminary evaluation to identify areas and sectors in the Mekong delta that are vulnerable to the effects of climate change. This includes rising temperatures, sea level increases, floods and flash floods, storms, landslides, and droughts. The regional tourism sector will be significantly impacted since tourism operations and recreational activities are sensitive and can only adapt up to a certain point, as detailed in Table 1. In this table, tourism-related issues are highlighted in red.

Table 1. Sensitivity and adaptability levels.

Target categories	Sensitivity	Adaptability
Water resources	Highly sensitive	Adaptable to a certain extent
Agriculture and food security	Highly sensitive	Adaptable to a certain extent
Marine and coastal ecosystems	Highly sensitive	Unclear or hardly adaptable
Forestry	Sensitive	Adaptable to a certain extent
Aquaculture	Sensitive	Adaptable to a certain extent
Irrigation (mostly infrastructure)	Sensitive	Adaptable to a certain extent
Energy	Sensitive	Adaptable to a certain extent
Transportation	Sensitive	Adaptable to a certain extent
Industry and Construction	Sensitive	Adaptable to a certain extent
Tourism, Sport, and Recreational activities	Sensitive	Adaptable to a certain extent
Trade and Services	Sensitive	Adaptable to a certain extent
Residential areas	Sensitive	Adaptable to a certain extent
Health care	Sensitive	Adaptable to a certain extent
Migration	Sensitive	Adaptable to a certain extent
Natural Landscape	Sensitive	Unclear

Source: Ministry of Natural Resources and Environment [48].

While increased temperatures and drought will only cause a medium level of impact on the tourism sector, the industry will be significantly affected at a high level of impact by rising sea levels, tropical cyclones, and floods, according to the National Target Programme to Respond to Climate Change (Table 2).

Table 2. Potential impacts of climate change and sea level rise by category.

Sector, area, object	Impact factors					
	Temperature rise	*Sea level rise*	*Tropical cyclones*	*Flood*	*Drought*	*Other climatic extremes*
Agriculture and food security	High	High	High	High	High	High
Aquaculture	High	High	High	High	Medium	Medium
Energy	High	Medium	Medium	Medium	High	Medium
Industry	High	High	Medium	Medium	Medium	Medium
Transportation	High	High	High	High	Medium	Medium
Construction	High	High	High	High	Medium	High
Tourism	Medium	High	High	High	Medium	Medium
Health care	High	Medium	Medium	High	High	High
Natural ecosystems and biodiversity	High	High	Medium	Medium	Medium	Medium
Water resources	High	High	Medium	High	High	Medium
Residential area	Medium	High	High	High	Medium	Medium

Source: Ministry of Natural Resources and Environment [48]. Tourism-related issues are indicated by the red colour.

Only a brief and infrequent discussion by the central tourist management in Vietnam regarding the effects of climate change on the tourism sector can be found in the publication "Tourism Planning for Mekong delta to 2030" from the Ministry of Culture, Sport and Tourism [50]. It indicates that climate change may have a significant impact on tourism resources in the Mekong delta, especially those located near the seaside. The process of adapting to climate change may result in the fading or transformation of traditional cultural values. Moreover, the region's ancient cultural structures might be damaged by extreme weather events. The primary culture of the Mekong delta is based on rice agriculture, associated with cultural values such as temples and festivals, which are considered ceremonies for agricultural activities. As the economy transitions from agriculture to other sectors, these temples and festivities will gradually disappear. However, pagodas and temples are

enduring cultural values that serve as the foundation for the preservation of associated ephemeral values. Consequently, it seems inevitable that festivals will become extinct due to the absence of temples and pagodas.

5. Implications for sustainable development in the Vietnamese Mekong delta under climate change

Tourism is a resource-based industry. The instability of tourism resources in the Mekong delta due to climate change has exerted considerable pressure on the sustainable development process of this sector. The imbalance of tourism resources, considered as an environmental factor in the "Triple Bottom Line," may lead to the unsustainability of economic and social indicators.

Achieving the triple bottom lines of sustainable development through strategic planning and stakeholder involvement is paramount. According to the aforementioned three principles of the "Triple Bottom Line" [18], protecting the tourism environment, which should be a sustainable tourism resource, is the paramount goal in the context of climate change. This primary goal will determine the outcomes of the other two goals: improving the quality of life for the local community and sustainably meeting the needs of tourists.

Numerous studies assert that professional planning is the most crucial step in any climate change adaptation process [72-74]. This study highlights the considerable challenges facing the Mekong delta's tourism sector due to the absence of a strategic plan for climate adaptation. This lack leads to various adverse effects on the region's tourism industry, such as a lack of clear direction and vision for tourism development in the Mekong delta and an unsystematic approach to infrastructure development. Consequently, the tourism sector in the Mekong delta remains unsustainable and is heavily impacted by climatic conditions, as evidenced by the results of a questionnaire survey.

Therefore, it is both crucial and significant to devise an action plan addressing the challenges of climate change in the tourism sector to ensure the sustainability of the region's tourism businesses in the long term. Central and local authorities, perceived as primary players in this process, can utilise both top-down and bottom-up strategies in collaboration with various stakeholders, such as local businesses, non-governmental organisations, scientific institutions, area residents, and tourists. This plan has the potential to serve as a blueprint for future development initiatives in the area's tourism sector.

In reality, there is a notable absence of robust strategic planning for the tourism industry in light of climate change. Implementing this plan is a lingering concern. Thus, it falls to the authorities to devise a plan and implement it both institutionally and more broadly within society. An effective way to foster widespread adoption of sustainable tourism practices is by raising climate change awareness through educational campaigns.

This paper posits that the Mekong delta's tourism development faces five significant threats from climate change: sea level rise, increased storms, heightened salinity, rising temperatures, and erratic rainfall patterns. Among these, sea level rise is deemed to present the most substantial risk. Consequently, adapting to sea level rise should take precedence in the climate change adaptation process. Each threat, however, possesses distinct characteristics. Beyond general climate change adaptation scenarios, it is vital to consider comprehensive, detailed adaptation plans for specific threats. Moreover, reinforcing the building code is pivotal when adapting tourism accommodations in the region.

This analysis suggests that a combination of both hard and soft approaches will be most effective for climate change adaptation in the Mekong delta. The hard approach predominantly targets infrastructural solutions, such as building modifications, while the soft approach focuses on non-infrastructural solutions, like climate impact mitigation strategies or initiatives promoting coexistence with changing climates. Tourism, an economic activity grounded in natural resources, is interconnected with sectors like agriculture, fishing, manufacturing, and transportation. Lessons from climate change adaptation in these sectors indicate that Mekong delta tourism cannot adapt in isolation; it must be part of a broader programme addressing economic and social facets of climate vulnerabilities. Hence, the sustainable development approach is central to the climate change adaptation guidelines for the Mekong delta's

tourism sector. The soft approach should be at the core of every initiative since evidence suggests that hard methods might be counterproductive, potentially undermining the long-term development of the Vietnamese Mekong delta. For this region, embracing the mottos 'reputation of being natural' and 'living with nature' can confer enduring benefits and foster unique local values, particularly bolstering ecotourism ventures.

Climate change presents a formidable challenge for the Mekong delta's tourism sector's development trajectory. Thus, a comprehensive evaluation of climate change impacts on tourism is imperative for the region. Currently, tourism climate change adaptation in the Mekong delta is rudimentary and lacks strategic foresight. A long-term adaptation programme is essential. For a viable and sustainable climate change adaptation initiative in the Mekong delta's tourism sector, this study recommends the steps depicted in Fig. 1.

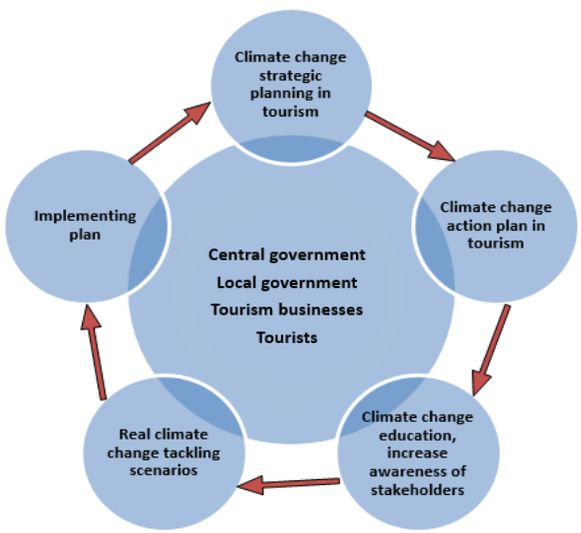

Fig. 1. Steps for a successful climate change program in tourism in the Mekong delta.

In this model, due to the pronounced centralised governance in Vietnam, both central and local governments reside at the heart of all actions. For facilitating climate change adaptation within the tourism sector, the cycle should encompass the following steps: Climate change strategic planning, tourism-climate change action plan, tourism climate change education, enhanced stakeholder awareness, climate change mitigation scenarios, and plan implementation. This cyclical approach will ensure a sustainable programme dedicated to climate change adaptation in tourism.

It is imperative to devise effective strategies addressing climate change's impact on the Mekong delta's tourism sector. This onus hinges on substantial backing from both local and central government entities as well as local agencies. Moreover, this analysis offers a panoramic perspective on climate change repercussions and adaptations in the Vietnamese Mekong delta. Consequently, further research, especially scientific studies focused on climate prognostications, is essential to elucidate the precise state of climate change impacts and adaptation strategies, notably at specific sites and tourist destinations.

CRediT author statement

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COMPETING INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this article.

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