



**DEVELOPMENT OF A RESILIENT COASTAL WETLANDS DESIGN
FRAMEWORK TOWARDS ECOTOURISM EDUCATION IN SETIU
WETLAND, MALAYSIA**

By

BALQIS BINTI AMINUDDIN

**Thesis Submitted to the School of Graduate Studies, Universiti Putra
Malaysia, in Fulfilment of the Requirements for the Degree of
Doctor of Philosophy**

May 2024

FRSB 2024 3

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Abstract of thesis presented to the Senate of Universiti Putra Malaysia in fulfillment of the requirement for the degree of Doctor of Philosophy

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MAY 2024

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This thesis aims to develop a resilient coastal wetland design framework for ecotourism education in Malaysia's Setiu Wetland. The objectives of this research are to (i) identify gaps in the physical design for ecotourism educational experiences, (ii) determine emerging themes from stakeholders to develop a coastal wetland design framework, and (iii) develop indicators for resilient design to improve monitoring and control strategies for ecotourism education.

The theories of change, sustainability, and resilience are used with qualitative approaches grounded in constructivism. This study establishes the interlinkages between the physical environment, stakeholders, and educational activities. Triangulation and thematic analysis are used for peer review and expert interpretation.

This study reveals 23 physical design and infrastructure deficiencies, including missing signs and empty spaces, that hinder quality ecotourism education. It emphasises the need for sustainable practices, tourism, and environmental education. Resilient design incorporating economic, environmental, and social performance elements and VR-BIM technologies can improve monitoring and control methods. One can establish a complete plan that features technology and community participation for sustainable ecotourism activities at the coastal wetland zone.

This research can help the Malaysian Ministry of Education and Tourism promote the coastal wetlands as a globally recognised destination for outdoor education and a high-skilled talent production centre. These activities are estimated to benefit the local community, boost the local economy, and expand the tourist industry.

Keywords: Coastal Wetland, Ecotourism Education, Resilient Design

SDG: GOAL 4: Quality Education, GOAL 9: Industry, Innovation and Infrastructure, GOAL 11: Sustainable Cities and Communities

Abstrak tesis yang dikemukakan kepada Senat Universiti Putra Malaysia sebagai memenuhi keperluan untuk Ijazah Doktor Falsafah

PEMBANGUNAN RANGKA KERJA REKABENTUK TANAH BENCAH PANTAI YANG BERDAYA TAHAN KE ARAH PENDIDIKAN EKOPELANCONGAN DI TANAH BENCAH SETIU, MALAYSIA

Oleh

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MAY 2024

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Tesis ini bertujuan untuk membangunkan rangka kerja reka bentuk tanah bencah yang berdaya tahan untuk pendidikan ekopelancongan di Tanah Bencah Setiu, Terengganu, Malaysia. Objektif penyelidikan ini adalah untuk: (i) Mengenal pasti jurang dalam reka bentuk fizikal bagi pengalaman pendidikan ekopelancongan; (ii) menentukan tema hasil daripada pihak berkepentingan untuk membangunkan rangka kerja reka bentuk tanah lembap pantai; dan (iii) membangunkan garis panduan untuk reka bentuk mampan bagi meningkatkan strategi pemantauan dan kawalan dalam pendidikan ekopelancongan.

Teori Perubahan, Kelestarian, dan Ketahanan digunakan dengan pendekatan kualitatif yang berasaskan konstruktivisme. Kajian ini bertujuan untuk mewujudkan hubungan antara persekitaran fizikal, pihak berkepentingan, dan aktiviti pendidikan. Triangulasi dan analisis tematik digunakan untuk semakan penilaian sebaya dan ulasan dari pakar.

Dapatan kajian ini menunjukkan 23 kelemahan dalam reka bentuk fizikal dan infrastruktur, termasuk ketiadaan papan tanda dan ruang lapang yang mengekang kualiti pendidikan ekopelancongan. Kajian ini juga menekankan keperluan untuk amalan lestari, pelancongan, dan pendidikan alam sekitar. Reka bentuk yang mampan, gabungan elemen seperti prestasi ekonomi, alam sekitar, dan sosial serta teknologi VR-BIM, mampu memperbaiki kaedah pemantauan dan kawalan. Perancangan yang holistik menampilkan teknologi dan penglibatan komuniti setempat boleh diwujudkan untuk ekopelancongan lestari di sekitar zon tanah benchah pantai.

Penyelidikan ini dapat membantu Kementerian Pendidikan dan Kementerian Pelancongan Malaysia mempromosikan tanah benchah pantai sebagai destinasi diiktiraf di peringkat global untuk pendidikan luar kelas, serta pusat melahirkan bakat berkemahiran tinggi. Ia dijangka memberi manfaat kepada komuniti tempatan, meningkatkan ekonomi setempat, serta mengembangkan industri pelancongan.

Kata Kunci: Tanah Benchah, Pendidikan Ekopelancongan, Rekabentuk Berdaya Tahan

SDG: MATLAMAT 4: Pendidikan Berkualiti, MATLAMAT 9: Industri, Inovasi dan Infrastruktur, MATLAMAT 11: Bandar dan Komuniti Mampan

ACKNOWLEDGEMENTS

Sincerely, I extend my gratitude to the following individuals and organisations for their invaluable support and contributions during this journey:

I am extremely thankful to Dr. Siow May Ling for her unwavering guidance, expertise, and tolerance. Her support and insightful feedback were indispensable. In addition, Prof. Madya Dr. Sumarni Ismail and Dr. Siti Sarah Herman, who are my research committee members, provided invaluable suggestions, constructive criticism, and insights that substantially improved this work. I sincerely appreciate Prof. Madya Dr Mohammad Yazah Mat Rachid's invaluable guidance during the initial stages of my PhD studies (Al-Fatihah).

My colleagues' technical support, discussions, and collaborative efforts were indispensable in surmounting challenges and attaining outcomes. Providing the requisite resources and data by the School of Wetlands personnel facilitated the feasibility of this research. The support and cooperation they provided were greatly appreciated. In addition, I would like to express my appreciation to the study participants for their contributions, time, and experiences, which have substantially enhanced the study's findings. Lastly, I continually thank my family members and closest friends for their immense support, motivation and patience. I am so blessed by how they have rallied behind me, trusted in me, and supported my vision for this year.

Thank you again for your priceless support.

This thesis was submitted to the Senate of Universiti Putra Malaysia and has been accepted as fulfilment of the requirement for the degree of Doctor of Philosophy. The members of the Supervisory Committee were as follows:

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LIST OF ABBREVIATIONS

AR	Augmented reality
BIM	Building Information Modelling
CBD	Convention on Biological Diversity
CEPA	Communication, Education, Participation, and Awareness
DFID	Department for International Development
EIA	Environmental impact assessments
EPA	Environmental Protection Agency
GIS	Geographic Information Systems
MNS	Malaysian Nature Society
NGO	Non-governmental organisations
PAR	Participatory Action Research
RFN	Rancangan Fizikal Negara
RKK	Rancangan Kawasan Khas
RSN	Rancangan Struktur Negeri
RTD	Rancangan Tempatan Daerah
SDG	Sustainable Development Goals
SWOT	Strengths, weaknesses, opportunities, and threats
TALC	Tourism Area Life Circle
TASEE	Theory of Adaptive Sustainability Environment Education
TIES	The International Ecotourism Society
ToC	Theory of Change
UN	United Nations
VR	Virtual reality

CHAPTER 1

INTRODUCTION

The Setiu Wetland represents a distinctive ecosystem that necessitates careful consideration in facility design to mitigate potential adverse effects. The design substantially bolsters the rural economy within the Setiu Wetland area and the broader ecotourism industry. Architectural design is always essential to ensure that Setiu Wetland is an effective and sustainable ecotourism destination for educational purposes.

The integration offers enormous potential to improve the educational nature experience, sustainability of local communities, and the international tourism industry. Generally, a lack of interest in the physical design features of most public wetlands has lessened their ability to remain amenity-rich and valuable parts of the natural environment for fully interactive educational experiences. According to Franco et al. (2017), there is now a sizeable body of evidence on the effects of natural experiences on people.

The COVID-19 pandemic serves as a severe warning about maintaining wetland ecosystems. By preserving and restoring wetland ecosystems, the current crisis presents a perfect opportunity for innovation and nurturing options that can simultaneously advance social and ecological welfare. The COVID-19 pandemic has devastated the Malaysian tourism industry (Andriotis et al., 2023).

Recognising the significance of an effective indicator tool is imperative in ensuring the sustainability and enhancement of ecotourism. The first chapter explains the study's fundamental concepts before identifying the crucial issues and the focus. Figure 1.1 illustrates the sequential flow of Chapter 1, which begins with the identification of different components, such as (i) the definition of critical elements, (ii) a description of the study site, (iii) the problem statement, (iv) the significance of the study, and (v) the research objectives.

1.1 Definition of Key Element

The major components of this research are the basic concepts used to introduce particular definitions and explanations about integrating all aspects and thoughts. The conversation begins with an overview of the global perspective on wetlands, with a particular emphasis on the Ramsar Convention's Communication, Education, Participation, and Awareness (CEPA) programme. The following section provides an overview of Malaysia's wetlands, focusing on Setiu Wetland. It continues with ecotourism, environmental education, and the Setiu Wetland's design development.

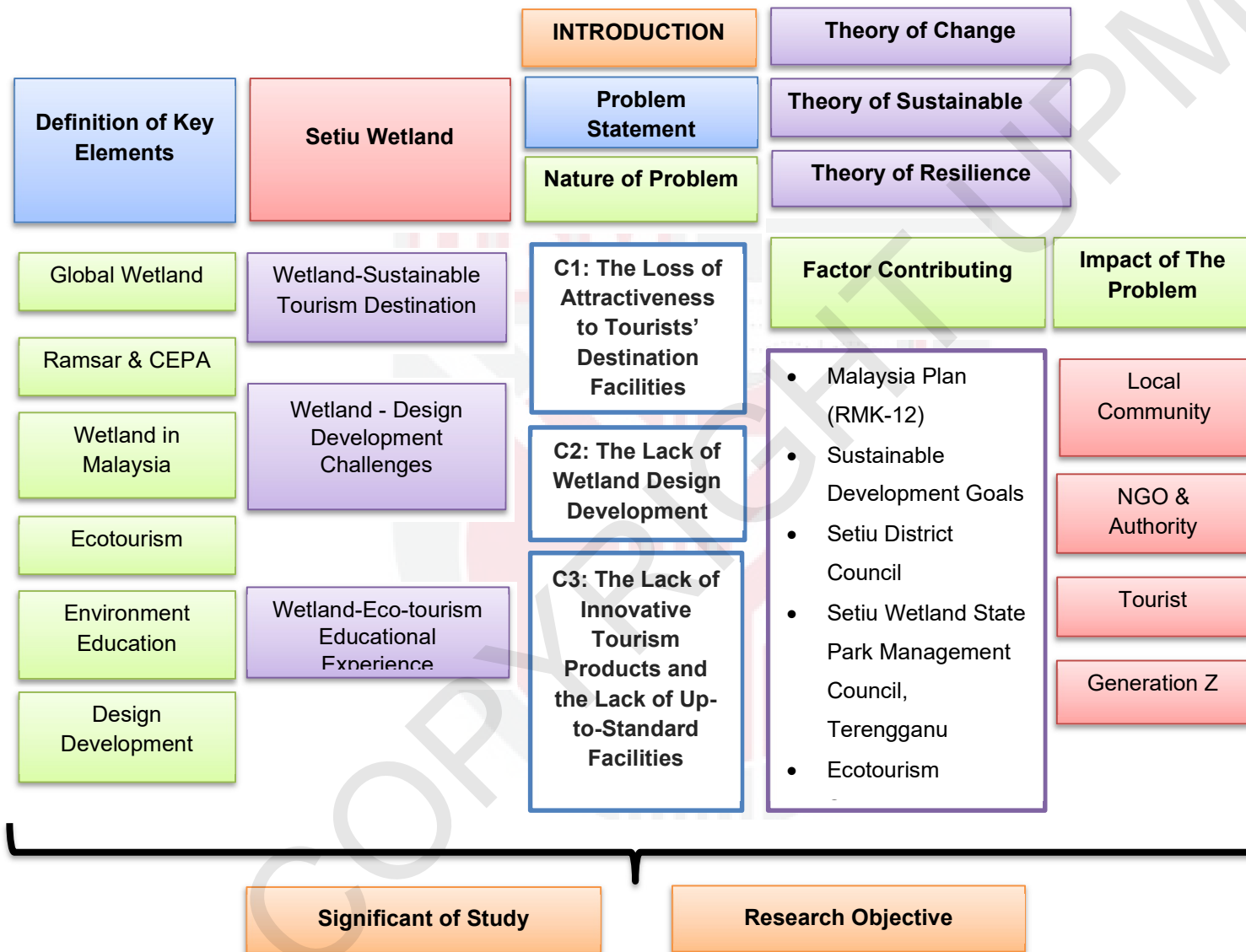


Figure 1.1: Orientation of Chapter 1

1.1.1 Global Wetland

Wetlands are often known as the “Kidney of the Earth” because they are essential in cleansing water by successfully eliminating sediments, chemical compounds, and other contaminants. The Ramsar Convention defines wetlands as a wide range of natural environments, including lakes, rivers, underground aquifers, swamps, marshes, wet grasslands, peatlands, oases, estuaries, deltas, tidal flats, mangroves, coastal areas, coral reefs, and various man-made sites such as fishponds, rice paddies, reservoirs, and salt pans.

Wetlands are defined in the Convention’s statement as areas of marsh, fen, peat land, or water, whether natural or artificial, permanent or temporary, with water that is static or flowing, fresh, brackish, or salt, including areas of marine water the depth of which at low tide does not exceed 6 metres (Ramsar, 2013).

Furthermore, in the quest for coherent sites, Article 2.1 calls for the listing of wetlands on the Ramsar list of internationally essential lands:

“May incorporate riparian and coastal zones adjacent to the wetlands and islands or bodies of marine water deeper than six (6) metres at low tide lying within the wetlands” (Ramsar, 2013).

Wetlands are divided into three types: tidal or coastal wetlands, inland wetlands, and human-made wetlands, as shown in Figure 1.2. Tidal wetlands are prone to wave action and flooding, which causes soil anoxia and salt. The coastal wetland is a unique wetland located in the transition zone between terrestrial and aquatic ecosystems, where it plays a vital role in maintaining local biodiversity and promoting regional sustainable development (Jiang et al., 2015; Kirwan & Megonigal, 2013).

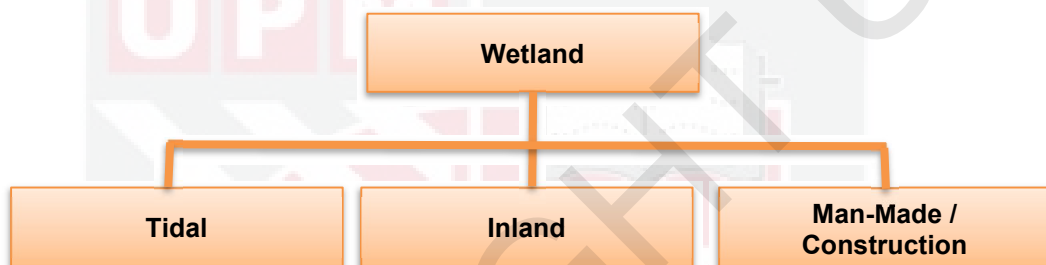


Figure 1.2: Type of Wetland

Coastal wetlands offer various ecosystem services, including food and salt, water purification, shoreline stabilisation, carbon sequestration, and flood prevention (Barbier et al., 2011). Moreover, it is noteworthy that coastal wetlands—acknowledged as the most intensively used habitats globally—serve as essential ecosystems that are rapidly degrading. According to Farber (1987), coastal wetland is considered a natural barrier against the destructive effects of wind, inundation, and flooding caused by hurricanes and storms. It is necessary to safeguard coastal communities and their inhabitants. Craft et al. (2018) assert that various ecosystems characterise beaches and wetlands at the interface between the coast and the sea.

Wetlands play an essential role in global biodiversity by providing habitat for a wide range of plant and animal species, many of which are endemic and others that are vulnerable or endangered. They serve as breeding and rearing grounds for fish, amphibians, birds, and invertebrates, significantly contributing to world biodiversity (Mitsch & Gosselink, 2015).

Wetlands are sites of resources where millions of humans carry out their economic ventures through fishing, agriculture, and tourism. They also help in climate control through the amounts of carbon they sequester, thus controlling and mitigating climate change effects (Duarte et al., 2013).

Wetlands face many dangers, from cities' extension to contamination, global warming, and resource overconsumption. These critical sites must be well-conserved and properly managed because international agreements such as the Ramsar Convention and national and local efforts are vital to ensuring that wetland environments are defended now and in the future (Ramsar, 2013).

1.1.2 Ramsar Site Wetland in Malaysia

Malaysia has seven (7) Ramsar wetlands, classified as Wetlands of International Importance by the Ramsar Convention on Wetlands. These wetlands receive unique preservation and care due to their significant ecological, cultural, and economic significance. The list of Ramsar sites and their sizes is shown in Table 1.1.

Table 1.1: 7 Ramsar Site, 134,182 hectares

Ramsar Site	Hectares (ha)
Kota Kinabalu Wetland	24
Kuching Wetlands National Park	6,610
Lower Kinabatangan – Segama Wetland	78,803
Pulau Kukup	647
Sungai Pulai	9,126
Tanjung Piai	526
Tasek Bera	38,446

(Source: <https://www.ramsar.org/sites/default/files/documents/library/sitelist.pdf> – 26/10/2022)

1.1.3 Communication, Educational and Public Awareness (CEPA)

The strength of the Ramsar Convention is, among other things, its acknowledgement of the value of human support for wetland conservation and its forms in its approach to CEPA raising. CEPA national focal points are experts in communication, capacity development, education, participation, and awareness, one from the government and one from a non-governmental organisation (NGO). They collaborate to develop and implement national and local wetland programmes and action plans to protect wetlands and coastal areas.

The Convention's CEPA Programme on Wetlands recognises wetlands education centres for their contribution to promoting wetland conservation and wise use. They range from high-tech centres welcoming large crowds to simple, unstaffed centres that provide a limited but effective wetland CEPA experience.

In Malaysia, Kota Kinabalu Wetlands, Sabah, under Ramsar, provided the educational atmosphere to educate the younger generation on the importance of wetland preservation.

1.1.4 An Overview of Wetlands in Malaysia

Wetlands are very biologically essential ecosystems that provide a range of critical functions for community support, carbon sequestration, and biodiversity habitats. Mangroves, peat swamps, freshwater marshes, intertidal mudflats, and many other types of wetlands are all present in Malaysia, which has excellent habitat diversity. These wetland ecosystems account for around 6.4% of the country's total land area (Wetlands International, 2013).



Figure 1.3: Coastal Wetland with Mangroves Areas in Malaysia

The extent of Malaysia's natural wetlands is considerable, but the recorded coverage currently stands at approximately 5.1 million hectares. In addition, Malaysia has many significant lakes and almost 100 river systems. The natural wetlands include peat swamps, mangroves, river systems, lakes, and coral reefs, offering a natural habitat for plant and animal species diversity.

As the National Wetland Policy of Malaysia explained in 1999, wetlands are areas of land that are either seasonally or permanently waterlogged or inundated. Ecological services entail maintaining water regimes and preserving biodiversity at each level, from individual organisms to genetic diversity and entire ecosystems.

Wetlands in Malaysia have immense ecological value and offer significant economic value to the local communities. They often support the fisheries and farming industries of many communities. Wetland systems rely on ecosystem services that involve risks but provide beneficial outcomes for human communities and support economic growth. Such services include flood control and water purification.

Besides natural wetlands, there are artificial or constructed wetlands, examples of which include the Putrajaya Wetlands, Paya Indah Wetlands, and paddy fields. Malaysia has an estimated 699,980 hectares dedicated to paddy agriculture (Department of Agriculture, 2020).

1.1.5 Ecotourism in Malaysia

The International Ecotourism Society (TIES, 2015) explained that travel to natural areas involves interpretation and education and concerns the welfare of the local populace, the environment, and human conduct towards natural places. Mangroves have many ecological and cultural benefits that could enhance the quality of life in the community. With mangroves, Malaysia can offer these ecosystem services (Jalani, 2012).

One of the functions a lake can perform is providing recreational services. Many aquatic recreational activities, such as swimming, boating, and various forms of water sports, negatively impact the quality of bodies of water. However, it must also be highlighted that ecotourism can positively affect the environment and promote various environmental values. Ecotourism involves the attraction and harnessing of natural resources, including the harmonisation of natural and cultural resources. Ahmad et al. (2016) detail managing and organising tourism activities in areas under protection or, specifically, wetland ecosystems.

The main idea of ecotourism is to travel to these natural environments while causing as little disturbance as possible to the ecosystems and supporting the conservation of the ecosystems and their wildlife. This concept in sustainable tourism seeks to support conservation and educational programmes and economically benefit the local communities surrounding such areas. Typical ecotourism activities in Malaysia include observing wildlife, hiking, camping, and bird-watching, with some cultural experiences that emphasise natural and cultural heritage.

Among the core tenets embedded within ecotourism are responsible travel, conservation, community involvement, and education. With ample opportunities to practice eco-friendly tourism within its rainforests and biodiversity-rich ecosystems, Borneo has many environmental and local benefits.

1.1.6 Environment Education in Malaysia

Environmental education is conveying information and raising awareness about the natural environment, the complex interactions of living things and their habitats, and the impact of human activities on the environment. Environmental education uses a broad array of pedagogical media to help learners learn about environmental problems and develop the skills, attitudes, and values to enhance their capacity to work towards long-term environmental care and responsible behaviour. The institutional environments, which could be formal, like educational institutions and universities, or even informal, like neighbourhood societies and nature preserves, will further support environmental education (Palmer, 1998).

The Malaysian government has prioritised environmental education due to the country's rapid industrial growth and urbanisation, severely leading to environmental degradation and breakdown during this period (Zurina et al., 2013). The government has incorporated it into the country's education system to ensure it enhances sustainable development.

Environmental education is incorporated into the national curriculum for elementary and secondary schools, comprising a variety of topics in science, geography, and social studies that cover environmental issues comprehensively (Malaysian Ministry of Education, 2019).

The Malaysian government has set up a National Environmental Education Action Plan, or NEEAP, for better coordination and promotion of the sectors concerned with environmental education efforts (Ministry of Natural Resources and Environment Malaysia, 2007).

Moreover, some NGOs and commercial sectors have contributed significantly to environmental education through community programmes, seminars, and campaigns. For example, the programmes by the Worldwide Fund for Nature (WWF) Malaysia and the Malaysian Nature Society (MNS) have contributed immensely to raising public awareness about environmental issues in Malaysia (WWF Malaysia, 2015).

Malaysia recognises environmental education as a means to support sustainable development progress. Attempts are being made to integrate it into the school system and encourage it through advocacy in many fields. Contemporary environmental challenges, such as pollution, loss of biodiversity, and climate change, need incessant innovation and support for environmental education.

1.1.7 An Overview of Wetlands in Malaysia

Coastal wetlands are among Malaysia's critical ecosystems that offer many social, cultural, and economic benefits. Such places provide opportunities for ecotourism; they serve as natural barriers against floods and storm surges, feed fisheries, and are also home to various plants and animals. On this note, there is a need to adopt a holistic design and development for the Malaysian coastal wetland, with strands of ecologically-based, community-interactive, resilient infrastructure and resilience approaches. This chapter provides a general overview of the elements essential to establishing a coastal wetland in Malaysia, using the case study area of Setiu Wetland in Terengganu.

3.12.1.2 Ecological Evaluation and Preservation

The coastal wetland's initial step is to design and develop an ecological assessment. Maintaining perfect biodiversity will require an extensive survey to maintain the diversity of flora and fauna found in the marsh. Effective conservation designs have to consider the existing state of biodiversity for their implementation, as Mitsch and Gosselink (2015) suggested. Habitat restoration is another constituent that involves replacing or re-establishing native vegetation to provide habitats that support wildlife or a particular species.

Wetland health is dependent on good water quality. Water quality objectives are met by minimising run-off and managing contaminants to protect and improve water quality. Water management techniques help wetland ecosystems remain healthy and balanced by maintaining their fitness for an extended period (Environmental Protection Agency, 2020).

1.1.7.2 Resilient Infrastructure

Resilient coastal wetland infrastructure development minimises human impact yet allows for access to facilitate ecotourism and conservation. Boardwalks and trails are two examples of ecologically sensitive access routes that enable visitors to experience a marsh without causing damage to more sensitive areas. Visitor facilities should be constructed using sustainable materials and techniques that reduce their ecological impact (Lockwood et al., 2006).

Renewable energy also diminishes the carbon footprint and fosters the sustainability of the wetland facility. The facility incorporates renewable sources of energy, such as solar panel infrastructure. Integration with modern technologies may also optimise the investigation of wetlands utilising VR-BIM and enhance the development of Setiu Wetland. Sustainable infrastructure promotes conservation and supports visitors with eco-friendly facilities, promoting a better tourist experience, according to Chiras in 2016.

1.1.7.3 Local Community Involvement

Therefore, successful coastal wetland projects are significant in terms of local community involvement during the design and development phases. Pretty (2003) explains that such involvement fosters a sense of ownership and responsibility for the wetland, ensuring the needs and opinions of the local people are considered.

Environment education may expose and target various audiences, including visitors, schools, and the local community, to convey critical knowledge about wetland habitats and their importance (UNESCO, 2021). Integrating educational activities using modern technology is essential for raising public awareness of the need for wetlands protection.

Providing local communities with long-term economic opportunities through ecotourism and conservation projects is vital. Locals benefit economically from wetland protection because they can engage in ecotourism programmes such as guided tours and cultural activities, which assist in maintaining sustainable lifestyles (Honey, 2008).

1.1.7.4 Resilient and Adaptation

Coastal wetlands are particularly vulnerable to the negative consequences of climate change, such as rising sea levels and more frequent storms. Planning to strengthen wetlands' resilience to these changes is essential.

Mangrove restoration and other natural barriers that fend against erosion and storm surges are examples of climate change adaptation strategies (Gilman et al., 2008).

Erosion control is another critical subject to consider. Mangrove plantings and constructing natural barriers may help stop coastal erosion, safeguarding the wetland and its inhabitants. These measures contribute to the long-term resilience of coastal wetlands, ensuring their ability to withstand environmental changes (Barbier et al., 2011).

Flood management techniques are required to prevent flooding in coastal regions. A thorough study of the wetland's hydrology is necessary to design efficient flood control methods, and actions that reduce the danger of flooding while maintaining the area's biological integrity must be taken (Day et al., 2007).

1.1.7.5 Policy and Governance

Effective governance supported by well-designed policy frameworks is essential for the sustainable development of coastal wetlands. The regulatory frameworks must balance conservation with the Sustainable Development Goals. Integrating wetland development plans with the UN's Sustainable Development Goals could put Malaysia on its way to contributing to global sustainability while also helping to resolve local conservation issues.

It is essential to ensure coordination in the development of wetlands with these objectives, as well as monitoring and continuous evaluation of the health of wetlands and the effectiveness of these measures. This would help to ensure periodic checks that can assure adaptive management for success in the long-term (Nichols & Williams, 2006).

There should, therefore, be a holistic development designed by way of the coastal wetlands in Malaysia. It should incorporate ecological conservation with sustainable infrastructure, community engagement, resilience strategies, and a practical policy framework. Malaysia will be urged to ensure the long-term health and sustainability of coastal wetlands, providing ecological, economic, and social benefits for current and future generations. The Setiu Wetland in Terengganu is a sterling example of how wetland development can work—amidst the battle between man's needs and nature's demands, holistic and inclusive approaches prove positive.

1.2 Site Study: Setiu Wetland, Terengganu, Malaysia

Setiu Wetland, Terengganu Darul Iman, Malaysia, exemplifies the principles outlined in this chapter. Managed through an integrated management plan, it balances conservation with community development. According to Ting et al. (2017), ecotourism operations in Setiu Wetland demonstrate the potential of sustainable tourism by promoting conservation efforts while providing economic benefits to neighbouring people.

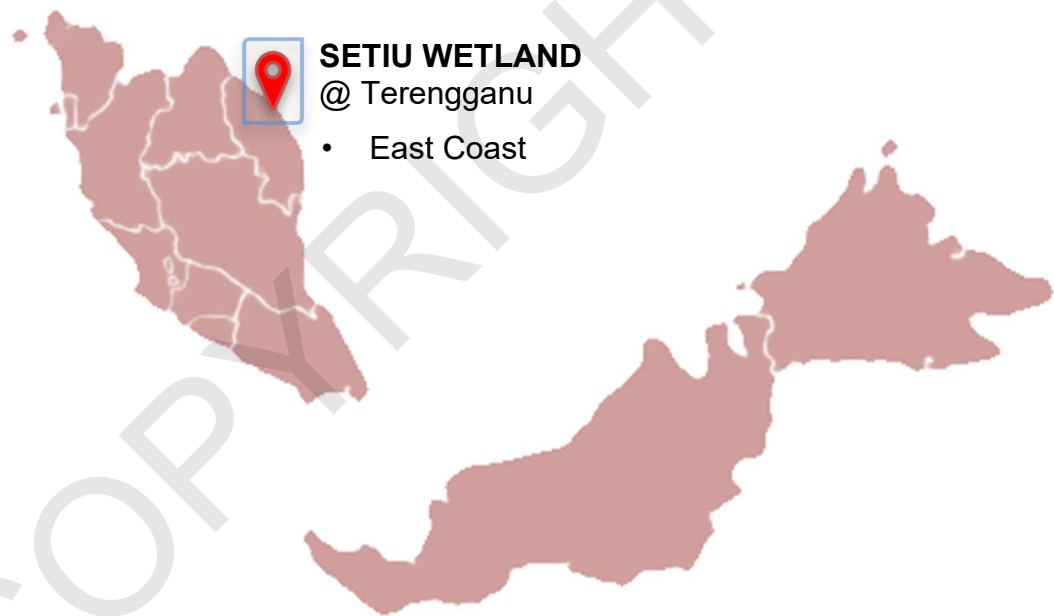


Figure 1.4: Position of Setiu Wetland in Malaysia

1.2.1 Terengganu Darul Iman, Malaysia

This Malaysian state, Terengganu, offers beauty with its white sand beaches and crystal-clear water along its 244-kilometre coastline. It is also home to one of the world's most beautiful and intriguing islands. The Northern Terengganu Region has four primary development zones: agricultural, tourist, municipal, and forest promotion.

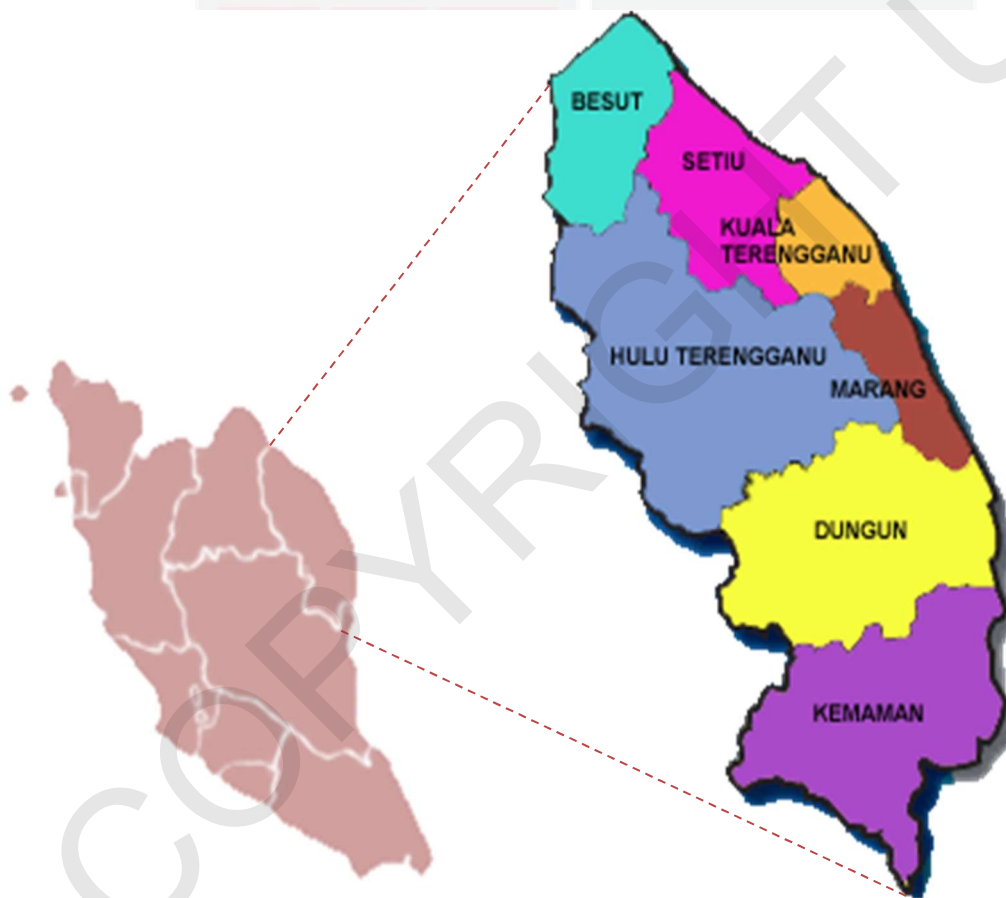


Figure 1.5: Position of District in the State of Terengganu

1.2.2 Setiu

Setiu is the youngest district of Terengganu Darul Iman's seven districts, as it was created on 1 January 1985. The district consists of 135,905.80 hectares, where the distance between Kampung Mangkuk (05036.830'N, 102048.320'E) and Kampung Beting Lintang (05043.968'N, 102039.839'E) is approximately 13 kilometres south of the road, north of Kampung Beting Lintang (05043.968'N, 102039.839'E). The district covers an area of 135,905.80 hectares, accounting for about 10.49 per cent of the state area of Terengganu Darul Iman. It shares borders with Kuala Terengganu to the north, Hulu Terengganu to the south, and Besut to the northeast. Then, there are the seven mukims that subdivide the district.

Table 1.2: The Area of Sub-districts in Setiu District

Sub- District	Area (Hectares)	Percentage
Hulu Nerus	54,523.30	40.12
Caluk	20,589.60	15.15
Hulu Setiu	23,292.90	17.14
Guntung	16,348.50	12.03
Tasik	5,827.10	4.29
Pantai	8,499.40	6.25
Merang	6,825.00	5.02
TOTAL	130,436.30	100.00

(Sources: Terengganu State UPEN Data Base 2002)

Note *: State Government Gazette 18/7/1996

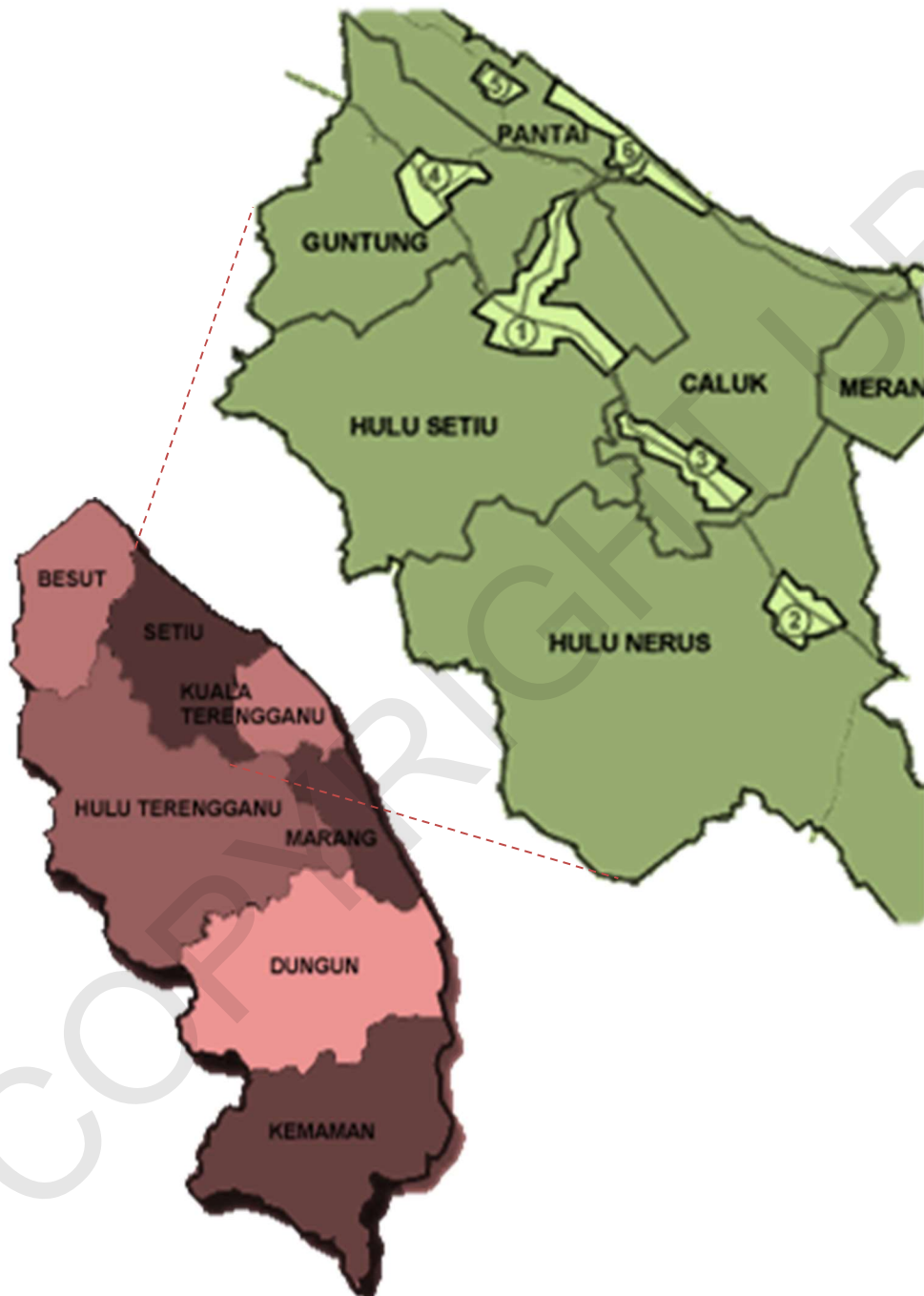


Figure 1.6: Position of Setiu Sub-District in the State of Terengganu

1.2.3 Setiu Wetland

Nestled on the East Coast of Peninsular Malaysia, Setiu Wetland, known as Tanah Bencah Setiu or Laguna Setiu in Malay, is a hidden gem in Terengganu. This wetland is integral to the Setiu River basin and the larger Setiu-Chalok-Bari-Merang wetland complex. Although it may not be as well-known as some other holiday places, Setiu Wetland boasts many flora and fauna, with no fewer than its migratory birds residing in this unique ecosystem.

Situated on 23,000 hectares with a 14-kilometre lagoon, Setiu Wetlands is the largest naturally occurring wetland on the East Coast area of Peninsular Malaysia. Travelling 502 miles to Setiu Wetland from Kuala Lumpur takes 5 hours and 46 minutes. There are nine interconnected ecosystems – the sea, rivers, sandy beaches, estuaries, mudflats, a lagoon, islands, freshwater swamps and mangroves.

There are several outdoor activities, as well as environmental education opportunities. The principal activities are boat cruises, fishing, bird-watching, and research. In addition, it provides eco-adventure or leisure activities, culture, and food as supporting products.



Figure 1.7: Setiu Wetland
 [Source: Rancangan Kawasan Khas (RKK)]

1.2.3.1 Sustainable Resilient Issues in Setiu Wetland

“Sustainable” and “resilient” are often used to discuss environmental, social, and economic issues.

Sustainability is a system or process’s ability to be maintained over time without the depletion of natural resources or causing environmental problems. It should be able to satisfy current needs and demands without creating difficulties or challenging situations for future generations to meet their needs. The United Nations defined in 2015 that “sustainable practices offer a positive and long-term return socially, economically, and environmentally.”.

A resilient community or system bounces back from the shocks and pressures, be it flooding, economic downturns, or social upheavals. Resilience requires a system or society to be adaptive and flexible, and it empowers such a system to cope with any misfortune that may hit it and further adapt learning to produce better outcomes in the future.

Such was the case with COVID-19. The outbreak of COVID-19 should act as a lesson to all. The time was up to develop and grow in ways that conserve and restore wetland habitats, paving the path to ecological and social healing. This outbreak has had a significant effect on the tourism business in Malaysia.

The facility design framework for the coastal wetland resilient facility for eco-touristic education experiences must be based on an overall plan considering the region's ecological, social, and economic characteristics. The following are a number of the key considerations:

Before the COVID-19 epidemic, environmental education and other tourism-related activities were isolated in Setiu Wetland without coordination or community involvement. This has led to the economic challenges caused by the lack of employment opportunities within the local community. Further, both locals and tourists showed, in most cases, no regard or appreciation for the natural environment. The infrastructure planning and construction were inefficient, which constrained the development of tourism and the conservation of the environment. The rural economy was growing but at a languid and unorganised pace.

Combined with this, the tourist industry shut down due to the COVID-19 pandemic, entailing massive job loss and greatly enhancing the social and economic hardship in the area. Several people lost their jobs since the closure of the tourist business. However, a push for 'green recovery' focused on environmental rehabilitation and sustainability. This meant that all operations related to the project, including infrastructure development and environmental conservation, were put to a halt. This sudden shutdown of direct sales and tourism-related activity has posed the risk of an economic meltdown of the local economy. It affected local businesses by shutting down direct sales channels, while online sales have been increasing progressively, indicating a shift in economic activities to online platforms.

1.2.3.2 Wetland Sustainable Tourism Destination

“Sustainable tourism destination” is an emerging term used as a commendation initiative to encourage sustainable city development. However, the importance of cleaner production cannot be overstated if “prevention” is to be incorporated into the concept of sustainable tourism destinations.

In 1941, Hunziker and Krapf described tourism as a person who travels “to the extent that they are not permanent residents and are not associated with earnings, a sum of the phenomena and relationships deriving from the travel and stay of non-residents” (Sharma, 2006).

“Tourism is the transient, short-term migration of people to destinations outside their normal locations of residence and employment, as well as their activities while at each destination.” As defined by the Tourist Society of England in 1976, it encompasses “movements for all purposes.” According to Gupta (2012), tourism and introduction as ecosystem services, wetland ecosystems are among the world’s most significant agricultural habitats while simultaneously providing major tourist and recreational facilities. Services include water, food, building supplies, transportation, and coastline protection. Tourists aware of the adverse environmental effects of tourism are more likely to engage in eco-friendly practices, contributing to the sustainability of tourist areas (Puhakka, 2011).

Tourism is one of the largest industries in the world, with maritime and coastal tourism being among its fastest-growing regions. Tourism is increasingly becoming conscious of its economic and, recently, environmental importance, but scientific research into this phenomenon has only recently emerged as a significant field of study (Hall, 2001). Unless tourism is planned and managed correctly, the main ecological benefits that wetland ecosystems, biodiversity, and nature give to these people will be compromised.

Accessibility, accommodation, attractions, activities, and amenities are the five main factors that make up a visiting destination. All of these refer to facilities. This includes:

- (i) **Attraction:** describes the features that attract visitors. It might be an area with nature, lakes, beaches, monuments, etc.
- (ii) **Accessibility** refers to accessibility or reaching an attraction. How did you get there?
- (iii) **Accommodation** is a place to rest or stay.
- (iv) **Amenities:** An enjoyable holiday would need food, water, and sanitation. It has nature excursions, history and architecture, water sports, vistas, and physical fitness activities. It has an amenity.

Sustainable tourism development is not merely a fad. Tourism depends on genuine care for social, ecological, and cultural structures. Tourism can contribute to sustainable development and aid in mitigating strategies for addressing our societies' complex problems.

One problem that has developed in Setiu Wetlands is the falling appeal of tourist destination facilities. Setiu Wetland has poor infrastructure for tourists to have a great appeal. The report by the Setiu District Council in 2015 has brought this problem out. The wetland is again lively during the day and dead during the night. Tourists are usually driven to reduce visitation if the place or a park is not appealing.

Values that would define the tourist demand and relation with the environment in most scenarios would also be presented to depict the challenges and their implications on the development of Malaysian tourism based on the literature, identification, and analysis of tourist attraction climates and tourist preference analysis by Asbollah et al. (2017). Besides, Asbollah et al. (2017) postulated that the values defining the tourist demand and their expressed relationship between tourists and the environment will predict the challenges and the implications of Malaysian tourism development through the literature review and identification and analysis of tourist attraction climates and preferences.

1.2.3.3 Wetland- Design Development Challenges

Best practices include choosing building and site design materials from sources that reduce damage and include lifespan, recycling, responsibility, and sustainability—using various management tools and techniques to enhance and complement one another (IUCN, 2020). However, there is hope that the needle will move in the opposite direction: wetlands are increasingly viewed as the primary nature-based solution for societal resilience, the impact of flooding and droughts is mitigated, clean water supplies are secured, food security is enabled, and people are buffered against the adverse effects of climate change (Wetland International, 2020).

These recreational areas are an excellent source of benefit for towns and cities (Mohamed & Othman, 2012) and are built to protect the natural environment (Ismail, 2002). They are used to help people experience nature (Cohen, 2009). Noralizawati (2009) found that visiting the park would split the focus of its users' sounds because of urbanisation activities. The attraction involves the park's products, facilities, services, and programmers (Ahmad et al., 2012). Visitors may want better quality parks with more maintenance, facilities with separate playing areas for children, and a desire for more protection.

According to Kusler (2006), visitors need local transportation, access to the wetland, roads, trails, a variety of birds, other species, plants and other attractions, knowledge of wetlands, guiding services, food, and lodging. In short, sustainable tourism will significantly contribute to environmental quality;

Economic growth and host well-being will also provide a quality experience to visitors and tourists (Lim McAllen, 2003).

The absence and weak construction of wetland amenities interfere with physical growth at Setiu Wetland. As the Setiu District Council Report states, municipal growth is gradual and primarily focused on Bandar Permaisuri, Sungai Tong, and Putera Jaya. Wetland tourism has the same issues since visitors actively harm wetland ecosystems via pollution, over-trampling, and disturbance (UNWTO Tourism, 2012).

Nature-based destination planners and managers could, therefore, consider enriching facilities, such as information boards, guided activities, and relaxation facilities, which could help to attract visitors who are likely to be intrinsically motivated (Chow et al., 2019). Besides that, the lack of innovative tourism products and up-to-date facilities often results in a loss of attractiveness and has contributed to a decline in the number of tourists visiting the wetland (UNWTO Tourism, 2012).

Most facilities are still in their old versions, as they have been established at the Wetland School of Setiu, so not many tourists know about them. The financial and human resources shortage directly affects capital investment and infrastructure growth for ecotourism (Ahmad et al., 2016). Furthermore, there is a lack of clear policies or guidelines concerning development at the national level. Unsustainable increased resource overcollection has led to coastal wetland degradation and destruction (Wetland International, (2020).

Malaysia has no single comprehensive law covering the protection and management of biodiversity, especially wetlands. Many regulations are sector-oriented (Irin Ibrahim et al., 2012). No regulation exists on the field. A policy draft is alive, but it has yet to be put into effect. This can be important because some guidelines have to be drawn up when the conservation and exploitation of wetlands are involved (Ibrahim, 2010).

“Sustainable tourism destination” is an emerging term used as a commendation initiative to encourage sustainable city development. There was a miscommunication. The importance of cleaner production cannot be overstated if “prevention” is to be incorporated into the concept of sustainable tourism destinations. The attraction has to do with the park’s products, including its facilities, services, and programmers. Visitors may want better quality parks with more maintenance, facilities with separate playing areas for children, and a desire for more protection.

1.2.3.4 Wetland-Eco-Touristic Education Experience

Tourists’ educational experiences through tourism facilities are vital in minimising adverse environmental impacts. However, they are hampered by the loss of attractiveness of coastal wetland tourist destinations. This is caused by the negative impact of a lack of innovative and up-to-standard tourism products and, therefore, the lack of wetland facilities and physical development. This controversy was exacerbated by a lack of clear policies or guidelines concerning the area at the national level, contributing to a decline in the number of tourists visiting the wetland.

Therefore, research and design strategies that support the engagement of the major stakeholders must be encouraged. This includes research into the educational experience of tourist nature, current coastal wetland facilities, and experts' opinions in designing strategies to improve visitors' experiences.

1.3 Problem Statement

The habitat of the Setiu Wetlands is degrading in biodiversity due to unsustainable tourism and a lack of infrastructure for learning eco-touristic experiences (Department of Environment, 2017). Additionally, the economic standards of local communities have diminished with time due to a need for alternatives for income generation. The infrastructure within the marsh and the technologies employed could be better, but they are primarily unsustainable and ineffective (Norizan et al., 2018).

The Setiu Wetland in Terengganu, Malaysia, is a significant natural and cultural heritage site with great potential for ecotourism. However, various challenges have hindered the establishment of a practical framework for ecotourism in this area. This chapter aims to identify the primary challenges impacting the educational experience of ecotourism in Setiu Wetland and propose potential solutions to address these challenges.

1.3.1 Nature of Problem Statement

Construct 1: The Loss of Attractiveness to Tourist Destination Facilities in Setiu Wetland

This significant factor contributes to the Setiu Wetland's low visibility and growth as a popular tourist destination. The decreased visiting rates (Ahmad et al., 2016; Asbollah et al., 2017) are the proof. Poor facilities and attractions relate to this. Increasing such facilities would thus improve the visitor experience and promote ecotourism effectively (UNWTO, 2012; Chow et al., 2019).

Proper research on visitors' needs and preferences is crucial in formulating an effective strategy for tourism planning (Ahmad et al., 2016). Indeed, what could attract tourists to visit places and what they value in their experiences would inform infrastructural and service improvements targeted at them.

Low visitor rates for a particular location or park are due to a lack of appealing features (Ahmad et al., 2016). Therefore, the weather conditions, tourist preferences, and values that shape tourism demand, besides their relation to the environment, need to be considered, as this might shed light on the challenges and implications for further tourism development, especially in Malaysia (Asbollah et al., 2017).

The allocation of visitor facilities is often used to regulate the distribution of tourism activities within a particular site. This strategy aims to attract and educate visitors in areas with limited potential adverse effects while keeping them away from more environmentally vulnerable regions (UNWTO Tourism, 2012).

Expanded amenities that cater to tourists' innate demands may play an essential role in encouraging repeat visits from nature-oriented visitors, hence adding to the development of tourism revenue for nature-based places (Chow et al., 2019).

Construct 2: The Lack of Design Development in Setiu Wetland

Setiu Wetland's lack of design development substantially hinders its attractiveness as a nature-based tourist destination. Poor agricultural management, limited facilities, and the harmful effects of tourist activities intensify this problem.

The Setiu District Local Reports (2015) indicate that poor management of agricultural areas and insufficient infrastructure services have led to low returns for farmers. Ecotourism's potential remains untapped due to a lack of contemporary facilities and appropriate management procedures. This inefficiency impacts local lives and reduces Setiu Wetland's appeal as a tourist attraction.

The UNWTO (2012) refers to the negative ecological impacts of tourism, including pollution and disturbance to habitat. This may lead to decreased natural beauty and biological integrity, thus rendering the wetland less hospitable to ecologically inclined tourists. Breaking out of these concerns by making strategic design improvements is the challenge of ensuring that tourist growth does not harm the ecology of wetlands.

Creswell (2023) illustrates that innovative visitor experience design is critical in ecotourism. He proposes that ecotourism education centres and upgrading existing facilities enhance tourist involvement and satisfaction.

Regarding this, Ahmad et al. (2023) have argued that facilities play a vital role in the diffusion of environmental education and implementing practices related to sustainable tourism. It is possible that facility designs that integrate new technologies can offer innovative solutions for all problems Setiu Wetland is currently facing. For instance, sustainable building and intelligent management systems can reduce environmental impacts and enhance visitor experiences. As new studies have shown, adding technology to tourism infrastructure gives rise to effective resource management and increases visitor engagement.

Construct 3: The Lack of Innovative Tourism Products and The Lack of Up-To-Standard Facilities

The non-availability of innovative tourism products and up-to-standard facilities has been one of the prime factors in Setiu Wetland, which has declined in tourist numbers and satisfaction. The need for clear national policies and guidelines governing infrastructure development for tourism in areas of high ecological sensitivity has primarily made this worse.

Innovative tourism products are a critical factor that interests visitors, especially in a nature-based tourist destination such as Setiu Wetland. According to Chow et al. (2019), facilities enhance the visitor experience since upgrading facilities will enhance tourist satisfaction, which may raise visitation. However, in terms of Setiu Wetland, based on the Setiu District Report, tourists seemed to be interested in something other than this wetland area due to the lack of cutting-edge technologies and modern infrastructure. This collapse of innovation has dramatically removed appeal, as tourists have always yearned for experiences that are not formulaic but are alluringly excitingly unique.

The UNWTO (2012) highlights how inadequate the facilities at these places have been. According to the report, more standard tourism products and facilities are needed, a significant factor in the current decreasing tourist numbers in Setiu Wetland. Ahmad et al. (2016) strengthen this by saying that the physical development of wetland facilities stores capital and infrastructure investment in limited provisions for ecotourism growth.

The absence of enforceable national policies and guidelines dealing with tourism development in ecologically fragile areas, like Setiu Wetland, has added to the difficulties at this destination. These provide no basis for effective national policies, which makes the challenging situations in Setiu Wetland all the more relevant. The UNWTO (2012) further states in its report that a great focus is put on capacity building for sustainable tourism policy formulation, which goes unreported. However, this is coupled with the need for more policies, hindering innovative and up-to-standard facilities and contributing to the decline in tourist numbers.

In addition, all the challenges that afflicted Setiu Wetland in terms of lack of innovative tourism products and up-to-standard facilities can be well taken care of by advancing relevant research and developing the appropriate design strategy validated with the major stakeholders. Such research included, among others, the investigation into the natural educational experiences of tourists, the evaluation of current facilities available in the coastal wetlands, and expert views that could guarantee the final designs provide the solution. Starting from identifying the gaps within the tourism products through stakeholders' engagement, sets of strategies may be developed to gain support and reinforce the visitor experience of Setiu Wetland.

The significant contribution to the poor attraction of this destination is the unavailability of innovative tourism products and up-to-standard facilities. This is because no national interest exists; thus, no national policies and guidelines can address tourism development in ecologically sensitive areas.

From that perspective, therefore, challenges building Setiu Wetland should see the need for developing modern, attractive features for the new tourist demands while, at the same time, ensuring that their sole unique

The ecosystem is well-preserved. Encouraging research, including stakeholders, and developing design strategies will further enhance Setiu Wetland as a site for nature-based tourism and contribute to the region's sustainable development.

Numerous studies and articles covering the period from 2014 to 2024 examine ecological, economic, and conservation issues in the Setiu Wetlands in Terengganu, Malaysia, and give insight into the problems and opportunities associated with ecotourism and conservation.

There is a need to promote research and formulate appropriate design strategies supported by the involvement of the main stakeholders. This includes investigations of tourists' nature educational experience, existing coastal wetland facilities, and experts' views to open a pathway to formulating strategies to reinforce the tourists' experiences.

1.3.2 Factors Causing the Problem

1.3.2.1 Malaysia Plan (RMK-12)

The Twelfth Malaysia Plan of Malaysia converges with the resilient coastal wetland design framework for ecotourism education encounters on sustainable development, biodiversity, climate change adaptation, tourism development, and education. The 12MP emphasises balancing sustainable development, environmental conservation, and economic progress. It emphasises the need for Malaysia to conserve its rich ecosystems and wildlife, particularly its coastal wetlands, and includes strategies for mitigating climate change. Recognising education as an integral part of sustainable development, the 12MP emphasises responsible tourism development as an essential economic impetus.

The commitments towards green growth, reflected in the 11th Malaysia Plan, are manifold. This represents a significant paradigm shift from the “grow first, clean up later” kind of development paradigm to low-carbon, resource-efficient, socially inclusive development as the primary driver of investment. Embrace green growth in order to be resilient. The case study on the Setiu Wetland was chosen because it had to effect specific changes in the physical design of its facilities as a tourist destination. Furthermore, very little research has been conducted on developing schools of wetlands and related infrastructure.

1.3.2.2 Sustainable Development Goals

The design and development of an effective framework for coastal wetlands that promote eco-touristic educational experiences following many of the Sustainable Development Goals, including SDG 14: Life Below Water, SDG 15: Life on Land, SDG 8: Decent Work and Economic Growth, and SDG 4: Quality Education.

The project may, among other things, contribute to the protection and restoration of marine and coastal ecosystems, promote sustainable tourist practices, create new employment opportunities, or advance quality education.

1.3.2.3 Setiu District Council

According to the Setiu District Council's report (2015), many issues, challenges, and opportunities related to the case study area in Setiu have been recognised. The Setiu district has a vast tract of ecologically sensitive land, with a massive portion covering 54.5 per cent of its total area. Besides that, there is a diverse landscape of coastal, swamp, and lagoon areas next to Setiu.

Low population density and economic growth based on traditional agriculture typically yield low employment and financial returns. The urban growth rate is prolonged; thus, there is a low range of services within the metropolitan areas. This therefore leads to retarded urban growth, especially in terms of commercial growth, public facilities and services, and public transport service delivery.

1.3.2.4 Setiu Wetland State Park Management Council, Terengganu

Setiu Wetland State Park is also known as Setiu Weland, and, for a protected area, it has gained some accolades within the state of Terengganu Darul Iman. According to the statement of vision, it is meant to gain worldwide recognition as the leading model in biodiversity protection and sustainable ecotourism. This also applies to the issue of biodiversity conservation for the present and future generations.

This will help preserve and protect many valuable components, such as flora and fauna, geological formations, old knowledge, historical and ethnological objects, and other scientific and panoramic wealth. Other objectives include educational progress, improving people's health, enhancing beautiful and artistic value, and people's responses.

Moreover, the aim is to ensure that the flora and fauna habitat serves as a catchment area and contributes to maintaining the ecosystem within the Setiu Wetland. Furthermore, efforts should be made toward realising the vision, purpose, and objectives of the Setiu Wetland State Park Management of Terengganu.

1.3.2.5 Ecotourism Structure

Building up a solid coastal wetland design framework goes directly with the goals and principles of ecotourism, a kind of responsible tourism aiming to contribute towards community empowerment based on sustainable development and conservation. According to Yukevich (2013), the project's main objective will be to disseminate knowledge, raise awareness, act as a catalyst in the process of interpretation, and engage local populations in the management and actual operation of the coastal wetlands.

Concurrently, the project works towards conserving and protecting the natural resources associated with these wetland ecosystems. Moreover, it emphasises the need for empowerment and authentic engagement with the community.

1.3.3 Impact of the Problem

After identifying the stakeholders who participate in designing and developing facilities in the Setiu Wetland, the following aspects can be examined:

Design Planning for New Development

Local Community: The facilities should be planned to generate job opportunities and economic benefits for their communities. The design should also fulfil the community's cultural and social needs.

NGOs: NGOs should be consulted regarding suggestions on designing the buildings to be eco-friendly and cause minimum disturbance to the ecosystem.

Tourists: The entire infrastructure, accommodation, food, or other facilities should be designed to make visiting comfortable and enjoyable.

Authority: The infrastructure should be designed according to the laws and specifications laid down by the concerned authority.

Generation Z: Involving and educating the new generation about the wetland.

1.3.4 Summary of the Problem Statement

The significant constraining issues that make Setiu Wetland a less attractive destination for nature-based tourism include poor facilities and the inability to create innovative tourism products, or at least a lack of adequate design development, significantly lowering visitor rates and satisfaction. The prevalent infrastructure is small, and management strategies need to be improved; hence, it yields low economic returns to the local communities and generally reduces the appeal of the wetland as a whole.

Besides, negative ecological impacts from tourism at the site of interest, such as pollution and habitat disturbance, further degrade the site's natural beauty because of the absence of modern facilities and design development. Poor infrastructure does not help engage visitors and results in low tourist involvement and decreased satisfaction.

In this respect, experts have called for better facility design that integrates new technologies and sustainable management systems to upgrade visitors' experiences and reduce environmental damage (Creswell, 2023; Ahmad et al., 2023). Without any effective national policy regarding tourism growth in areas of ecological significance, negative prospects for the Setiu Wetland have turned grave.

Innovative tourism products must be developed through research and engagement with stakeholders. Likewise, infrastructure must be provided in conformance with the principles of sustainable tourism practices. Attending to all these three constituents would have placed Setiu Wetland in a better position to serve the goals of ecotourism and regional sustainable development.

Absence of Policy: According to UNWTO (2012), the lack of national policies in ecologically sensitive areas contributes to management challenges. These issues can be addressed by fostering research and developing strategies that stakeholders support to upscale Setiu Wetland as a sustainable tourism destination. Therefore, tourism and nature education experiences in developing coastal wetlands must adopt a holistic approach to create a view catering to ecological, cultural, and social factors.

Physical planning and design elements that emphasise sustainability, interpretation, accessibility, and safety open up the potential for a much-improved experience in visitor development and maintaining these irreplaceable ecosystems over time.

Table 1.3: Summary of Problem Statements, Objectives and Outcome

Problem Statement	Objectives	Outcome
<p>Current Resilient Issues: Wetland Tourism with Covid-19 Pandemic Scenario</p> <p>Construct 1: The lack of awareness and attractiveness to tourist destination facilities in ecotourism educational experiences in Setiu Wetland</p> <p>Construct 2: The lack of physical development in ecotourism education in Setiu Wetland</p> <p>Construct 3: The lack of innovative tourism products and facilities for ecotourism education in Setiu Wetland</p>	<p>RO1: To identify the gaps in the physical design for ecotourism educational experiences in Setiu Wetland</p> <p>RO2: To determine emerging themes from stakeholders in developing a coastal wetland design framework towards ecotourism education.</p> <p>RO3: To develop indicators for resilient design in the monitoring and control strategies of ecotourism education in Setiu Wetland.</p>	<p>To develop a resilient coastal wetland design framework towards Ecotourism education in Setiu Wetland, Malaysia</p>

1.4 Research Aim and Objective

Research Aim

To develop a resilient coastal wetland design framework towards ecotourism education in Setiu Wetland, Malaysia

Research Objectives

RO1: To identify the gaps in the physical design for ecotourism educational experiences in Setiu Wetland

RO2: To determine emerging themes from stakeholders in developing a coastal wetland design framework towards ecotourism education.

RO3: To develop indicators for resilient design in the monitoring and control strategies of ecotourism education in Setiu Wetland.

Research Questions

RQ1: How may the physical design of the educational ecotourism experiences at Setiu Wetland be improved, and why should there be such improvement?

RQ2: How do we determine emerging themes from stakeholders in developing a coastal wetland design framework towards ecotourism education and the reasons for its emergence?

RQ3: How can indicators for resilient design be developed in the monitoring and control strategies of ecotourism education in Setiu Wetland, and why are such indicators important?

1.5 Significance of the Study

The study's significance is rooted in its potential to improve educational experiences related to ecotourism in Setiu Wetland. This will be achieved by addressing deficiencies in the physical design of facilities, incorporating stakeholders' viewpoints, and promoting resilient and sustainable practices. This can play a supporting role in preserving the wetland ecosystem, the socio-economic development of the nearby communities, and an enhanced state of knowledge and consciousness among the visitors about the importance of preserving the environment.

1.6 Scope of the Study

The study's scope is highly relevant to the broader goal of enhancing ecotourism and sustainable development in Setiu Wetland by focusing on the design framework for ecotourism education. The study's focus on improving physical design and visitor educational experiences directly addresses the current challenges in Setiu Wetland, such as poor facilities, the lack of innovative tourism products, and adverse ecological impacts, as outlined in the problem statement.

By identifying and addressing gaps in the current infrastructure and design, this project will enhance the visitor experience while reducing tourism's ecological footprint, which is critical for maintaining the wetland's natural beauty and ecological integrity.

Moreover, the study's goal of gathering emergent stakeholder themes and developing monitoring and control benchmarks aligns with the need for stakeholder engagement in creating solutions. Involving various groups in constructing and managing the wetland will ensure that the proposed design strategies are practical and sustainable. This aligns with the calls for inclusive design and the need for policies and guidelines governing tourism development in ecologically sensitive areas.



1.7 Organisation of Chapters

Figure 1.8 illustrates the organisation of the entire study, spanning from Chapter 1 to Chapter 6. The discussion and findings are divided into four components.

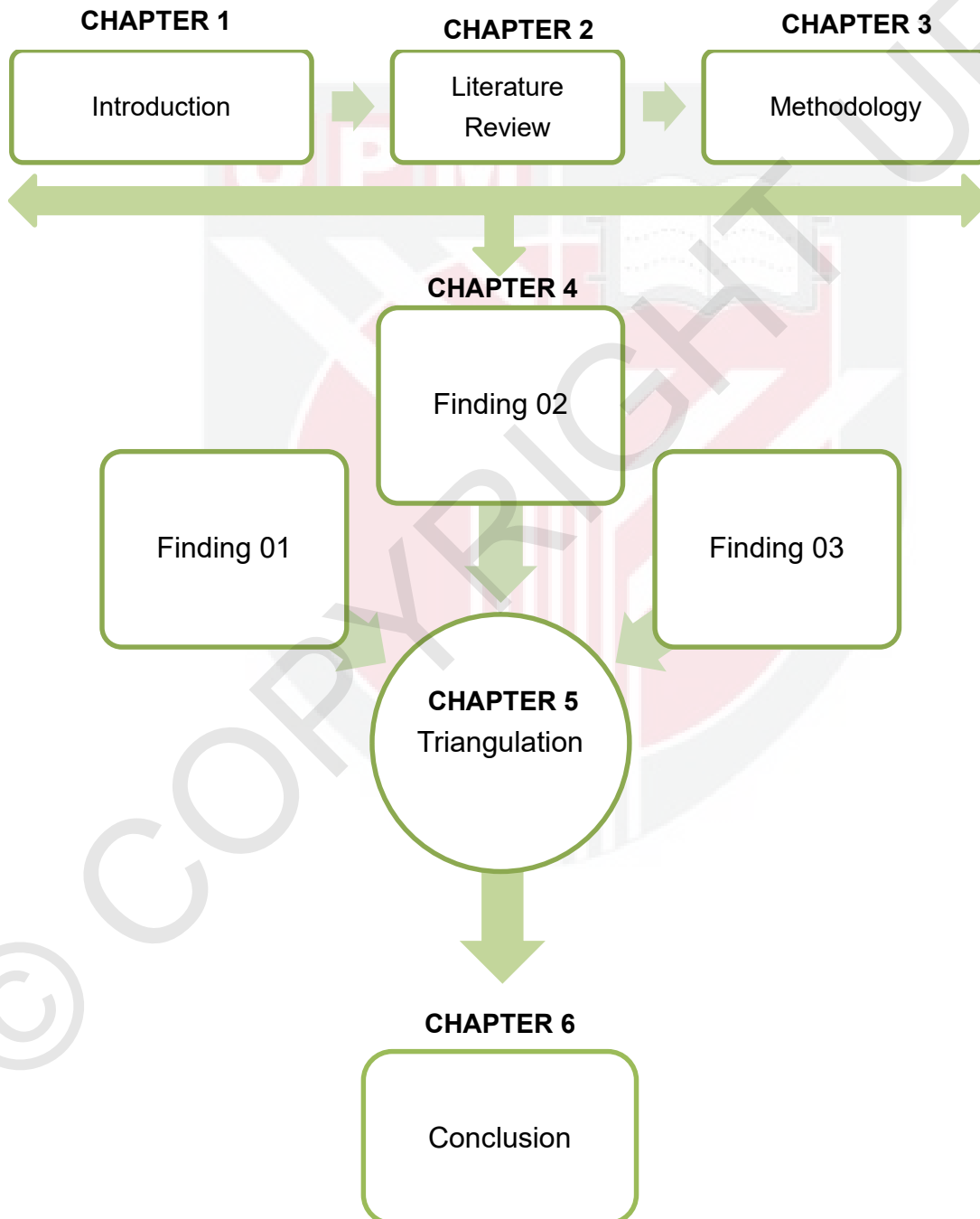


Figure 1.8: Orientation Chapter 1-6

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