The Role of Culture in The Resilience to Wind

The case of the Penghu archipelago, Taiwan

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This dissertation is dedicated to Tschick and the memories we shared

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Abstract

Resilience research has flourished since the publication of Holling's work, which has endured for half a century. Amount of resilience researchers noticed a significant gap is missing: the absence of a cultural perspective. However, there is no systematic work to address this flaw. Therefore, this research aims to examine ''the role of culture'' in the resilience to wind, with a focus on the Penghu archipelago in Taiwan, also known as the "wind islands." In addition to tropical typhoons in the summer season, people on the archipelago suffer from half a year of monsoons, and winter monsoon gusts sometimes reach the level of mediate typhoons.

To bridge this existing theoretical gap in resilience research, the research framework develops ''culturally oriented resilience'', encompassing two key notions: Cultural practices and cultural operations which are used to analyse the cultural responses to wind resilience on the Penghu archipelago. While cultural practice records specific cultural responses to wind at a particular moment in time, cultural operation places emphasis on the temporal perspective and the change of cultural patterns. This research categorises the functioning agents into three groups: Institutions, communities, and individuals, in order to examine their distinct roles in enhancing resilience. Additionally, through exploring how resilience as a Western concept travels to the Eastern academic discourse, examining the process of dissemination, acceptance and application.

Regarding the methodological choices, this research applied multi-qualitative approaches to gain a comprehensive understanding of wind resilience on the Penghu archipelago. This research digs into archives to trace the trajectory of wind resilience in the historical dimension; Mapping the traces of wind to examine the current adaptations from landscapes; conducts semi-structure interviews to understand the cognitive dimension of winds from experts and community members; and engages in participant observation for a direct interaction with informants. These four methods provide insights into how agents respond to the wind in terms of spatial and temporal aspects.

Using the frame of cultural practises and cultural operations reveals the respective roles among agents to wind resilience, and their cooperation and conflicts. Furthermore, the results demonstrate the meaning of cultural, spatial, and temporal dimensions in adaptation processes. On the one hand, monsoon is not viewed as a problem to be solved, but rather as

an integral aspect of daily life on Penghu. On the other hand, typhoons are not deeply ingrained in awareness due to their infrequent occurrence. Regarding the intersection of adaptations, while these adaptations were primarily developed to mitigate the impact of monsoons, they also prove useful in the face of typhoons, which bring strong winds.

In conclusion, this research found culture orchestrates responses to wind on the Penghu archipelago. When the learning process and adaptations apply, culture plays a stronger role in facilitating wind resilience. Oppositely, when narratives among agents are mismatched, or the communication is insufficient, the culture plays an obstacle role in enhancing wind resilience.

Zusammenfassung

Die Forschung zur Resilienz hat seit der Veröffentlichung von Hollings Grundlagenwerk vor mehr als einem halben Jahrhundert, stark zugenommen. Viele Resilienzforscher haben festgestellt, dass eine bedeutende Lücke besteht: die Integration einer kulturellen Perspektive. Es gibt jedoch bisher keine systematische Arbeit, um diese Lücke zu schließen.. Daher zielt meine Forschung darauf ab, "die Rolle der Kultur" in der Resilienz gegenüber Wind zu untersuchen, mit einem Fokus auf dem Penghu-Archipel in Taiwan, auch bekannt als die "Windinseln". Neben tropischen Taifunen in der Sommersaison, leiden die Menschen auf dem Archipel während des Winterhalbjahrs unter Monsunen, und diese Monsunwinde erreichen zum Teil das Niveau von mittelstarken Taifunen.

Um diese bestehende theoretische Lücke in der Resilienzforschung zu überbrücken, wurde der Forschungsrahmen "kulturell orientierte Resilienz" entwickelt, der zwei Schlüsselbegriffe umfasst: "Kulturelle Praktiken" und "kulturelle Operationen", die zur Analyse der kulturellen Reaktionen, in Bezug auf die Windresilienz auf dem Penghu-Archipel verwendet werden. Während kulturelle Praktiken spezifische kulturelle Reaktionen auf Wind zu einem bestimmten Zeitpunkt erfassen, legen kulturelle Operationen den Schwerpunkt auf die zeitliche Perspektive und die Veränderung kultureller Muster. Diese Forschung kategorisiert die handelnden Agenten in drei Gruppen: Institutionen, Gemeinschaften und Einzelpersonen, um ihre jeweiligen Rollen bei der Stärkung der Resilienz zu untersuchen. Darüber hinaus wird erforscht, wie die westliche Konzeption von Resilienz in den östlichen akademischen Diskurs gelangt, und der Prozess ihrer Verbreitung, Akzeptanz und Anwendung wird untersucht.

In Bezug auf die methodische Vorgehensweise wende ich in meiner Forschung mehrere qualitative Ansätze an, um ein umfassendes Verständnis der Windresilienz auf dem Penghu-Archipel zu gewinnen. Für diese Arbeit wurden Archive durchsucht, um die Entwicklung der Windresilienz in der historischen Dimension nachzuverfolgen; „traces of wind“ vor Ort kartiert, um die aktuellen Anpassungen in der Landschaft zu untersuchen; semistrukturierte Interviews durchgeführt, um die Windwahrnehmung von Experten und Gemeindemitgliedern zu verstehen; und teilnehmende Beobachtungen gemacht, um eine direkte Interaktion mit den Agenten zu ermöglichen. Diese vier Methoden liefern Einblicke in

die Art und Weise, wie Agenten, in Bezug auf räumliche und zeitliche Aspekte, auf den Wind reagieren.

Die Erkenntnisse aus der Auswertung der definierten Kategorien "kulturelle Operationen" und " Kulturelle Praktiken" lassen Rückschlüsse auf die Resilienz und deren Einflussfaktoren ziehen. Sie zeigen die jeweilige Rolle der Agenten in Bezug auf die Windresilienz sowie deren Zusammenarbeit und Konflikte. Zudem verdeutlichen sie, wie sich Anpassungen unter Berücksichtigung kultureller, räumlicher und zeitlicher Rahmenbedingungen vollziehen. In diesem Kontext wird der Monsun einerseits nicht als Problem gesehen, sondern als integraler Bestandteil des täglichen Lebens auf Penghu. Andererseits sind Taifune aufgrund ihrer seltenen Vorkommen nicht tief im Bewusstsein verankert.

Zusammenfassend lässt sich feststellen, dass meine Forschung zeigt, dass die Kultur Reaktionen auf den Wind auf dem Penghu-Archipel beeinflusst. Wenn das Wissen und die Anpassungsstrategien erfolgreich angewendet werden, spielt die Kultur eine wichtige Rolle bei der Stärkung der Windresilienz. Umgekehrt kann die Kultur eine hinderliche Rolle bei der Verbesserung der Windresilienz spielen, nämlich dann, wenn die verschiedenen Agenten im System uneins sind, ihr Handeln gegenseitig beeinträchtigen oder die Kommunikation hierüber unzureichend ist, was wiederum die Verbesserung der Windkraftresilienz behindert.

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Abbreviations

RA	Resilience Alliance
SESs	social-ecological systems
PI	Personal interview
PO	Participant observation
GIS	Geographic information systems

Chapter 1: Introduction

夜靜龍門聽鼓浪 — 蔡廷蘭(1801-1859)《澎湖八景》

On the tranquil night, at Longmen, listen to the drumming of the waves play.

— Tshuà Tîng-lân (1801-1859) The Eight Natural Sceneries of Penghu

This verse is one of the eight natural sceneries of Penghu, described by a poet in the 19th century. It presents a majestic and vivid depiction of the monsoons. When the winter monsoons propel the waves, the rocks beneath the sea resemble lively drums. It's a dark and serene night resonating with the rhythmic sound of wave drums. People on the island listen to both the waves and the monsoon winds. The poem documents the wind, and these resounding sounds constitute one of the eight natural 'sceneries.' This illustrates how the poet portrayed the invisible wind. Two hundred years later, an interviewee from the Longmen community recounted the same scene to me. I realized that these powerful monsoons transcend generations, deeply embedded in the daily experiences of Penghu residents.

This research shows how culture is embedded in the wind resilience of the Penghu archipelago, Taiwan. I am curious to know how people live with winds, and how wind affects the daily practices, cognitive associations, and the spirit of Penghu.

1.1 Why cultural perspective of resilience

The term "resilience" is embedded in multiple realities which depend on the perspectives of the viewer. In the scientific discourse on resilience, different definitions and approaches exist, traceable to various epistemological roots (Cote & Nightingale, 2012; Ungar et al., 2005). In this context, this research provides a specific cultural perspective, known as "cultural-oriented resilience," which emphasizes the importance of culture within resilience research.

The first keyword, "resilience," is often used as a buzzword in the scientific literature (de Bruijn et al., 2017; Martin & Sunley, 2015). Especially in today's uncertain world, resilience is a highly sought-after concept. The term resilience originated within academic circles(Arora-

Jonsson, 2016), spanning disciplines from the natural to social sciences (Adger, 2000), and is increasingly promoted as an objective to be pursued by individuals, communities, regions, and even at the (inter) national level. Resilience is ubiquitous - encompassing psychological therapy for individuals, political discourse within societies, and even UNESCO's 2030 agenda for international cooperation in pursuit of sustainability (Bergman et al., 2018).

Regarding the history of resilience concept, since the 1970s, following Holling's influential paper (Holling, 1973), there has been a burgeoning body of literature in various disciplines that recognizes the significance of resilience. Resilience is a promising concept that has transcended from the natural sciences (physics, biology, ecology) to other fields, encompassing the study of social-ecological systems (SESs). The resilience concept offers a perspective on how a system deals with disturbances and stressors, assessing its capacity for persistence, adaptability, and transformability (Folke, 2006). After decades of discourse on resilience among scientists, resilience research has undergone multifaceted developments contingent on different focal areas and perspectives, such as community resilience, tourism resilience, or urban resilience, among others. Notably, not only do multiple classifications of resilience exist, but also diverse schools of thought within the resilience research. Holling's classic notion of bouncing back has evolved into the concept of bouncing forward (Muñoz-Erickson et al., 2021; Siambabala et al., 2011), where the aim is not to return to the original equilibrium but to establish a new, relatively stable state to ensure the system's continued functionality. Moreover, there is an ongoing debate regarding whether resilience is an outcome or a process (Saja et al., 2019a). Depending on the resilience of thought, researchers employ distinct methods for studying resilience.

Besides debating on operationalising, measuring and evaluating resilience, recent developments in resilience research have highlighted the need for a cultural perspective. Numerous forward-thinking resilience scholars have indicated that culture is absent in current resilience research (Appleby-Arnold et al., 2020; Arora-Jonsson, 2016; Bomhauer-Beins et al., 2019; Crane, 2010; Krüger et al., 2015; Valjakka, 2020). In this research, I address not only "why" culture is significant but also "how" it holds importance.

There are two dimensions that emphasize the significance of culture in resilience research. Firstly, there is the aspect of theoretical generalization. When a theory is formulated in a generalized manner, individuality tends to be minimized. However, the values held by agents

within a system can be highly diverse. Whether within a single system or across systems, norms and values which lead to function in the system can vary significantly among groups. A generalized resilience concept tends to overlook these differences, ultimately missing a crucial aspect in comprehending the values and mindsets of the agents involved. In this research, agents are defined as individual persons or groups of people functioning within the system. While this definition may simplify the complexity of behaviour exhibited by actors and agents within the system, particularly from the perspective of complexity theory, it is worth noting that *"individual agents act based on restricted information and to a large extent with self-interest; nevertheless, they are key in shaping the trajectory of the larger system,"* as pointed out by Ratter (Ratter, 2013, p. 5).

Even though distinguishing between agents and actors is commonplace in complexity theory (Ratter, 2012), I do not differentiate between the two in my research. Within the scope of this study, I use the term "agents" to refer to both. These agents possess their own set of values, priorities, and focal points when it comes to addressing stressors. In this research, agents are categorized as individuals, communities, and institutions.

The second dimension pertains to the diverse responses to similar natural stressors or disturbances. Why do cultures affected by similar stressors develop different coping strategies in different regions? Why do people in different cultures perceive the same risks in different ways (Krüger et al., 2015)? Regardless of whether the explanations revolve around environmental conditions, perceptions, behaviours, economics, or politics, they invariably connect to culture itself.

Therefore, the objective at the theoretical level of this research is to add a cultural perspective in resilience research that has been lacking so far. Regardless of the specific schools of thought to which resilience researchers belong to or the methods they employ, it is essential to recognize that culture forms a crucial backdrop to their research. A comprehensive understanding of resilience in research can only be achieved by incorporating a cultural perspective.

Culture is a catch all term, encompassing numerous facets of a society (Birukou et al., 2013). This can be problematic and it becomes challenging to exclude any elements from research considerations, therefore, resulting in loss of analytical focus. In this research, I focus

on the aspect of culture that enhances resilience and investigate its specific role in the context of wind resilience. In addition to investigating culture as a key factor in enhancing wind resilience, my research also places a substantial focus on spatiality and temporality. After understanding the theoretical gap of lacking culture in resilience research, I shed light on the research area in the next section. My empirical case study focuses on the cultural responses to wind resilience on the Penghu archipelago, Taiwan.

1.2 First encountering: People on wind islands claim ''wind is not a problem for us''

The Penghu archipelago, often referred to as the "wind islands," is comprised of 20 inhabited and around 70 uninhabited islands and is situated in the Taiwan Strait (Z. Chen, 1955). The archipelago is under the administration of Taiwan. Wind patterns in Penghu are mainly influenced by two distinct meteorological phenomena: typhoons and monsoons (National Science & Technology Center for Disaster, 2014; Penghu Government, 1960). Please note that the monsoon discussed in this research is the winter monsoon. The summer monsoon does not bring strong winds but only a breeze and is therefore not considered in this research. Notably, the monsoon experienced in Penghu differs from the monsoon in South Asia, as it brings minimal rainfall to the region due to the flat terrain. However, the wind speed during the monsoon season can occasionally reach the level of moderate typhoons (32.7-50.9 m/s). Furthermore, the monsoon season in Penghu is a protracted phenomenon, starting at the end of September and persisting until the following April. Consequently, Penghu remains under the influence of the monsoon for nearly half of the year, necessitating not only flora and fauna to adapt to this external stressor. The residents of Penghu have adjusted their lifestyles and occupations to fit these distinctive wind conditions. Another type of wind is typhoon, which frequently occurs in the summer season (Penghu Government, 2005). It is crucial to recognize that two types of wind, both typhoons and monsoons, have significant impacts on modern society and have played pivotal roles in shaping historical developments. More details about Penghu will be discussed in Section 4.1.

My first encounter with the Penghu archipelago and its residences was in 2016. During my first semester as a master's student, I attended the 16th International Conference on Penghu Research. It was late October, marking the beginning of the monsoon season. While sitting inside the conference hall, I heard people refer to Penghu as the "wind islands," and I

experienced the force of the monsoon wind as soon as I stepped outside the venue. The monsoon winds were not only strong but also carried a sticky saltiness that clung to my hair, despite having washed it just the night before. Several years later, I began my Ph.D. fieldwork on Penghu, to find the adaptations to winds in everyday life. While standing in a drugstore in the city centre of Magong, I suddenly chuckled. There were double or even triple the amount of hair products compared to the same brand's drugstore on Taiwan's main island. Wind even affects the selling of hair products.

The research project I am currently engaged in, CUORE (Cultures of Response), is based in Hamburg, which is situated 9,112 km away from the Wind Islands. Two of my supervisors shared their remarkable insights with me from their fieldwork on Penghu. They were surprised to discover that the people on the Wind Islands claim that "Wind is not a problem for us." This raised questions for us, considering that the Wind Islands experience half a year of strong, dry monsoons and summer typhoons. How could people not perceive the wind as a problem? The attitude of Penghu residents toward the wind is indeed intriguing, as there appears to be an inconsistency between my personal experiences with the wind on Penghu and how the people of Penghu portray their relationship with the wind. This simple statement was the spark for my research. This lit the flame of curiosity to explore the complicated relationship between Penghu residents and the two types of winds on Penghu islands.

1.3 Objective and guiding questions

The motivation for this research stems from the identified gap in current resilience research and the case study of the Penghu islands. Specifically, it arises from the discrepancy between the statements made by Penghu residents and my prior observations. The research aims to clarify the precise role of culture in enhancing wind resilience on the Penghu archipelago. Therefore, the overarching research objective is formulated as:

‘’Understanding the role of culture in shaping responses to wind on the Penghu archipelago.’’

This overarching research objective can be divided into three layers. 1) At the surface level, this research aims to gain an overview of the responses, containing both perceptions and

actions, to winds on the Penghu Islands. The overview of the responses to winds considering spatial and temporal dimensions. 2) The second layer considers the agents involved, with a specific focus on analysing the cooperation and conflicts that arise among agents in response to winds. This layer aims to clarify the roles and functions of these agents in the context of wind resilience. 3) The final layer involves the interpretation of the cultural perspective within resilience research, which I refer to as the concept of "culturally oriented resilience." This perspective serves to bridge the existing gap and contribute a previously missing perspective to the field of resilience studies.

In addition to the main research objective and the three layers previously outlined, four guiding questions follow. To gain a more comprehensive understanding of the cultural responses to winds on the Penghu archipelago within the mentioned first layer, this research categorizes agents into three distinct groups: institutions, communities, and individuals.

1. *How do different agents adapt to the two types of wind on the Penghu archipelago?*

I define institutions as organizations that have their own goals and are officially recognized as juridical persons. In this research, the term 'institutions' mainly refers to regimes, enterprises, and public schools. The boundaries of "communities" are outlined by administrative districts on the Penghu archipelago, with all members within these borders considered as a unit. Lastly, "individuals" refer to single human beings on Penghu islands. This question aims to gain an understanding of how Penghu residents adapt to living with two types of wind, specifically, what adaptations they employ for monsoons and typhoons. Its objective is to provide an overview of these adaptations. Following the collection of adaptations from agents, the second question focuses on the cognitive dimension.

2. *What are the perceptions of winds among the people of Penghu?*

Perception of the two types of wind can offer an interpreted perspective from various agents, facilitating a thorough investigation from a cultural perspective. This question is triggered by the surprising statement mentioned earlier. I wonder, why people from Penghu claim that wind is not a problem for them. The emphasis is on comprehending the context in which Penghu residents assert that wind is not a problem for them. Following the analysis of

responses to wind among various agents from guiding question 1, this question focuses on the cognitive dimension of winds. It aims to investigate how people relate to winds and how they perceive them. After understanding the responses (adaptation and perception) to winds, the third question leads to the distinct functions of agents.

3. *What functions do the distinct agents play in wind resilience?*

After comprehending the diversity of responses to wind from various agents, the second question involves analysing their respective roles in enhancing wind resilience – the second layer of the research objective. This analysis also includes examining cooperation and conflicts among the agents to better understand their roles within this context. The aim is to determine whether the responses to wind among agents align and to verify whether their mismatched narratives concerning responses exist.

4. *How does the notion of culture contribute to a culturally oriented resilience?*

As discussed above, my research aims to bridge the current resilience research gap through the lens of culturally-oriented resilience. I use the Penghu archipelago case study to systematically analyse cultural responses. I introduce two concepts that offer the potential to understand the role of culture in resilience in the theoretical chapter. These concepts are cultural practices and cultural operations, which together establish an integrated framework for understanding cultural responses to resilience.

Cultural practices are the cultural displays of resilience enhancement by agents. Cultural practices demonstrate a way of how to analyse culture of facilitating resilience. In the conceptual chapter, I will introduce the notion of cultural practices, identified through observable practices. A cultural practice is a specific adaptation at a specific time period. It does not cover extended time periods.

In contrast to cultural practices, **cultural operations** focus on the process of cultural production and transformation. Which means, the focus is on extended periods of time – time series. The main idea behind cultural operations is to observe the general patterns of how cultural practices transform and thus ultimately form or transform to cultural responses.

Cultural operations are formed by the merging of certain cultural practices under specific conditions. Yet, not every cultural practice can merge to form cultural operations. In short, cultural operations is the pattern how cultural practices change over time.

It is important to highlight, as I employ the concept of resilience, which originates from Western academic discourse, that my research is taking place within an East Asian context. One aspect that I focus on is understanding the trajectory of resilience concept as it travels diverse academic landscapes. To further illuminate this dynamic, I conduct a literature review of the resilience literature published in Taiwan and China. This review seeks to understand how and when the concept of resilience is received and applied within the East Asian academic context.

1.4 The research structures

The structure of this research is composed of six chapters. Chapter 1 begins with the research gap of the missing cultural perspective in resilience research, the research motivation, main research objective and four guiding questions, as mentioned above.

Chapter 2 contains the theoretical framework in which I clarify my theoretical position within the field of resilience research. In addition to explaining the key concepts surrounding resilience in scientific discourse, I introduce the concept of "travelling theory" and conduct a literature review of works published in Taiwan and China. This review highlights the existing gap of the cultural perspective within resilience research and lays the foundation for introducing a theoretical framework. This framework encompasses two notions - cultural practices and cultural operations - that facilitate the understanding of cultural-oriented resilience.

Chapter 3 discusses the methodological framework. I employ a combination of qualitative methods, including the Penghu case study, archival analysis, interviews with experts and community members, mapping, and insights drawn from participant observation. First, the archival analysis helps to understand wind phenomena that have been described and documented in historical texts related to Penghu. Additionally, mapping provides spatial adaptations to how various agents deal with wind-related challenges in the landscape.

Furthermore, interviews conducted with experts and community members offer valuable insights into the individual, communal, and institutional perspectives on winds. These interviews also aid in examining how wind influences lifestyles and shapes the culture of Penghu. Finally, participant observation provides a route for gaining in-depth insights from local residents while actively participating in shared activities.

Chapter 4 offers an in-depth introduction to the study area, the Penghu archipelago. Within this chapter, I provide a rationale for selecting Penghu as the case study area. I also explain the research emphasis on wind, exploring the terminology and linguistic aspects associated with wind on Penghu. Furthermore, I present the empirical findings based on a variety of research methods. This chapter presents all empiric results, displaying the cultural responses to wind resilience within the context of Penghu.

Chapter 5 discusses and contextualizes the empirical results, and it is divided into two parts. In the first part, I analyse the distinct functions agents hold within the system with regards to wind resilience. Second section presents the analytical outcomes related to cultural operations and cultural practices.

Chapter 6 is the conclusion, featuring three key findings and a research summary. It discusses conceptual and methodological advances, limitations and outlook.

Chapter 2: Conceptual Framework

Before delving into the research framework, clarifying the complicated web of terms feels truly exhausting. Yet, I believe that social scientists must delineate the boundaries and scope of the terms they employ; otherwise, discussions become hopelessly muddled. Throughout the process of writing this research, I have perused a considerable number of articles on resilience. As resilience has been coined from the 1970s to the present day, its multiple definitions and relations with other concepts have always been referenced. At times, resilience has been closely associated with other concepts. I once yearned to find the ultimate solution, but I realized that the more hurried I became, the deeper I sank into the mire.

Within the discourse on resilience, I have recognized the necessity, limitations, and possibilities of clarifying terminology. While the process of articulating the definitions of these concepts in writing has felt burdensome, it is only through clarifying my positionality and frameworks that I can engage in more precise discussions.

Many doctoral students, myself included, often approach the theoretical chapter with trepidation as if walking on thin ice. However, the theoretical framework is the vital start of thought. The analytic process requires reflection and time. It's like the metaphor my supervisors have shared with me: research is like kneading dough, it requires patience in the proportions, adjustments, and fermentation time.

Here you are.

Reflection during writing this chapter.

2.1 Resilience discussion

This chapter commences with a description of the resilience discourse, providing an overview of its evolution in scientific discourse over the past half-century. It then goes my positionality regarding resilience, offering clarity on the two dualistic epistemologies surrounding this concept. After establishing schools of resilience in the scientific discourse, I introduce the core concepts of resilience: adaptation, learning, perception, risk, and the differentiation between

disturbance and stressor interference. Given the focus of my case study on the Penghu archipelago, situated in East Asia, I analyse publications written in Chinese within Taiwan and China. My aim is to understand when the concept of resilience transitioned from the West to the East, and whether its content and focus experienced changes. Furthermore, I investigate how Asian academia has utilised this concept. Finally, as indicated in the introduction, the chapter centres on the cultural perspective of wind resilience. To comprehend the role of culture, I introduce two concepts, cultural practice and cultural operation of resilience, for analyzing responses to wind from a cultural perspective.

2.1.1 What is resilience? An overview of its evolution and perspectives

The concept of resilience has garnered significant attention and scholarly exploration across diverse disciplines, resulting in many interpretations and approaches. Resilience, a term deeply embedded within academic discourse, has engendered numerous definitions, leading to its application in various domains. These include but are not limited to engineering resilience, social-ecological resilience, urban resilience, disaster resilience, community

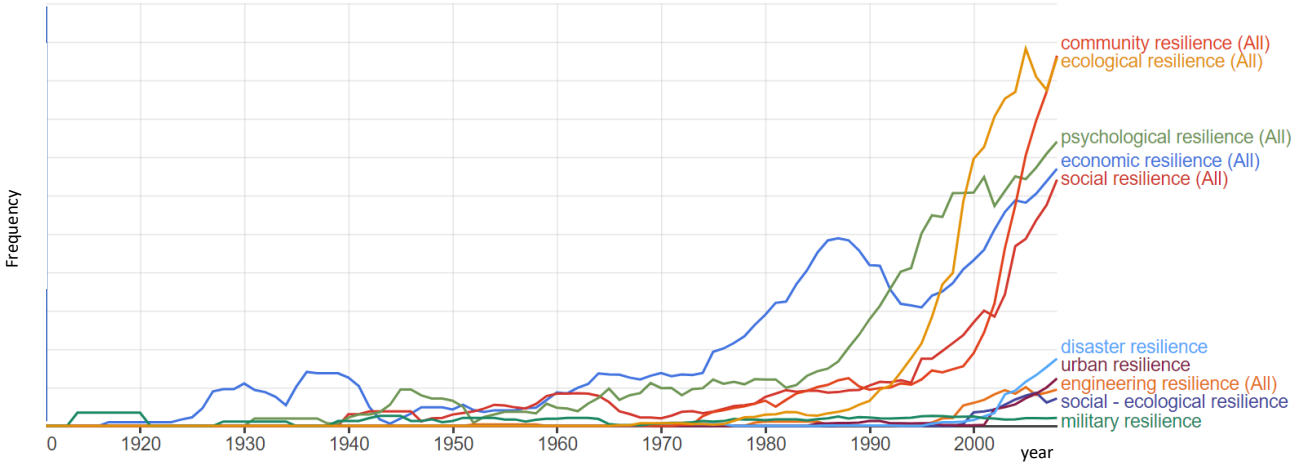


Figure 1 Google Ngram Viewer. This graph shows the relative number of hits in the large corpus of Google Books

resilience, and psychological resilience. The historical development of the term resilience can be roughly delineated, as depicted in Figure 1. The X-axis represents the publication year of works from the corpus, while the Y-axis depicts the frequency of the Ngrams. appear throughout the corpus. A corpus search on Google Books reveals the term's consistent presence within varying academic contexts. Resilience discourse sprayed notably after the 1970s, with a distinct increase around the 2000s, signifying the ongoing ascendance of

resilience research. Notably, ecological resilience initially dominated the field and served as the foundational discipline for resilience scholars within the realm of social science.

The notion of resilience has sustained interest for nearly half a century, catalysed mainly by Holling's seminal paper in the 1970s. In his groundbreaking work, Holling defined resilience as *"a measure of the persistence of systems and of their ability to absorb change and disturbance while still maintaining the same relationships between populations or state variables"* (Holling, 1973, p. 14). This definition laid the foundation for a protracted discourse on resilience. Adger further advanced the concept by linking ecological resilience with social resilience, highlighting communities' interdependence and economic activities on ecosystems. This perspective fostered a comprehensive understanding of resilience within social-ecological systems (Adger, 2000).

2.1.2 Three perspectives on resilience

Gunderson (2000) has clarified three distinct perspectives on resilience, as embraced by scholars over the past two decades. The first perspective conceptualises resilience as the duration required for a system to return to equilibrium after experiencing a perturbation. However, it is crucial to note that this perspective, often described as "bouncing back," is considered somewhat old-fashioned in contemporary resilience discussions (Uddin et al., 2020). It oversimplifies dynamic systems, which may evolve to new equilibria rather than reverting to their original states.

The second perspective diverges from the static equilibrium notion and emphasises a system's capacity to absorb disturbances of varying magnitudes before undergoing structural transformations. Gunderson stresses a critical distinction between these two resilience perspectives, grounded in their assumptions regarding the existence of multiple stable states (Gunderson, 2000). Unlike the first view, the second perspective acknowledges the potential existence of multiple stable states before and after system disturbances.

The third perspective on resilience underscores a system's adaptive capacity. It emphasises critical variables within socioecological systems that exhibit slower rates of change. This perspective prioritises the recovery and practical dimensions of resilience. Notably, the third perspective aligns with the present research's focus on resilience thinking,

emphasising adaptive capacity and highlighting the role of social systems in facilitating adaptations by various agents. As articulated by Folke, resilience offers a systemic lens through which to analyse a system's response to disturbances, assessing its capacity for persistence, adaptability, and transformability (Folke, 2006).

In short, the concept of resilience has evolved considerably over time, with different scholars offering distinct perspectives on its essence. This research aligns primarily with the third perspective of resilience thinking, prioritising examining adaptive capacity within social systems and its contribution to agent-driven adaptations. As highlighted by Folke, resilience serves as a comprehensive framework for assessing a system's ability to endure, adapt, and undergo transformative changes in the face of stresses and disturbances.

Notably, the chronological progression from Holling to Adger and then to Gunderson should not be misconstrued as a linear inheritance of arguments. Instead, it illustrates the diverse conceptual trends and varying perspectives within resilience discourse.

2.1.3 Dualistic epistemology

Two dualistic epistemologies of resilience are readily discernible to readers well-versed in the literature of resilience research the discussion often mentions these two principal controversies in the publications respectively. The first pertains to whether resilience ought to be understood as a descriptive or normative concept, while the second concerns whether resilience should be seen as a process or a result. The divergent views on these questions have created a bifurcation in the resilience research landscape. There is no absolute answer to the dualistic epistemology. Oppositely, the diverse perspectives constitute the fascinating concept of resilience.

Discussing the dualistic nature of resilience is essential for several reasons. Firstly, it helps to establish the researcher's position within the field of resilience studies. Epistemology, which deals with the nature of knowledge, plays a fundamental role in framing research and shaping how concepts are understood (Collins, 2011, p. 268). By clarifying two prominent dualistic perspectives on the essence of resilience, this research defines its perspective and provides the groundwork for methodological choices and concept interpretation.

These dualistic inquiries serve as the cornerstone of this study, guiding the selection of approaches, methods, and the interpretation of resilience. They enable a comprehensive grasp of the multifaceted nature of resilience. Additionally, this section addresses the critical elements of resilience. This research effectively manages its scope by narrowing down both the epistemological and elemental aspects of resilience, ensuring a focused and coherent investigation.

Is resilience a normative or a descriptive concept?

Regarding the normative and descriptive points of view, scholars who posit that resilience is a normative concept emphasise its aspirational quality, namely, that it denotes a reason for action (Thorén & Olsson, 2018). Conversely, proponents of the descriptive view argue that resilience is a neutral term that researchers record and observe in socio-ecological systems (Brand & Jax, 2007). Consequently, supporters of the descriptive view do not regard resilience as a goal in itself but rather as a value-neutral concept. This point is criticised, doubtlessly. If resilience is merely the aggregation of facts, which means, researchers leave value issues to others and only engage the reporting facts (Thorén & Olsson, 2018), such as corruption, poverty traps, or unsustainable use of natural resources, the undesirable conditions within the system (Mochizuki et al., 2018).

The stance taken in this dissertation aligns with the normative concept of resilience. It's worth considering the argument that resilience may initially be a descriptive idea before evolving into a normative concept. Indeed, the description is the initial step in constructing a narrative about the research subject. However, selecting what to describe and what to omit inherently involves the researcher's perspective, rendering it more than merely descriptive. The normative viewpoint posits that when observing a given object, whether a community, society, or ecological system, it should enhance resilience. This approach seeks to bridge the gap between scientific inquiry and real-world implications. If resilience were exclusively seen as a descriptive portrayal, it could inadvertently become a depoliticised tool (Cañizares et al., 2021). As a scientist, research mustn't devolve into a depoliticised tool that evades individual responsibility and disregards systemic mechanisms.

Is resilience a process or an outcome?

As a subject of academic investigation, resilience offers multiple methodological approaches, including the qualitative perspective, which conceptualises it as a process, and the

quantitative viewpoint, which measures it as an outcome (Almedom, 2013). This divergence arises from the fundamental question of whether resilience is the result of a static state or an ongoing dynamic process. Given the tension between these epistemologies, the initial standpoint significantly influences how resilience is perceived. While the inclusive nature of resilience is enticing, it can pose challenges or trigger mismatched research procedures when researchers fail to state their position explicitly.

Whether resilience is a process or an outcome carries important weight, mainly when indicators are involved (Copeland et al., 2020). Although this research doesn't seek to quantify resilience but rather aims to explore its cultural significance, addressing this duality remains pivotal. How resilience is conceptualised directly impacts the starting point of this research. In essence, *''Indicator-based quantitative measurement techniques are employed when resilience is regarded as an outcome. Conversely, qualitative attributes or surrogates are utilized to assess resilience when it is defined as a process''* (Uddin et al., 2020, p. 3). The theoretical orientation is a guiding framework for interpreting resilience and selecting the appropriate research methodology.

While valuable, the ongoing discourse surrounding the process-outcome debate in resilience research inadvertently creates an artificial division between the concepts of process and outcome. In this research, I view resilience as a process, although I acknowledge that it can also be seen as an outcome. This perspective depends on the context and focus of the analysis. Van Breda's statement demonstrates this viewpoint effectively: *''Conceptually, then, resilience is a process that leads to an outcome, and the central focus of resilience research is on the mediating processes''* (Van Breda, 2018, p. 4). This perspective underscores that the process and outcome viewpoints are not mutually exclusive and highlights the centrality of studying resilience as a process.

This research treats resilience as a process for two primary reasons. Firstly, the temporal dimension is of paramount importance. This dissertation emphasises the cultural dimension of resilience, recognising that culture evolves as an accumulation of societal representations. Consequently, I consider various temporal scales within different contexts, acknowledging the transformative nature of culture and its influence on resilience. Secondly, I account for the fluidity or inconsistency of narratives among agents. Resilience is an assemblage involving interaction, cooperation and contestation among agents within a

specific system. Hence, I perceive resilience as a dynamic process embedded within temporal scales rather than a static outcome.

By clarifying these two resilience epistemologies, I can now illuminate the core concepts surrounding resilience. These core concepts provide the essential elements for resilience and the main focus elements of resilience in this research.

2.1.4 Resilience for what? Resilience to whom?

Resilience discourse raises two fundamental questions: resilience to what? and resilience for whom (Cutter, 2016) ? The first question, resilience for what is built upon the aforementioned differentiation, this research specifically examines certain disturbances and stressors, as the introduction mentioned, wind resilience on the Penghu archipelago. Wind, defined as the movement of air and categorized based on meteorological definitions, assumes a significant role in this region. Two predominant wind phenomena are examined within the Penghu archipelago. Firstly, the disturbances caused by the monsoon and the stressors originating from tropical cyclones, so-called typhoons. These two wind phenomena will be detailed and illustrated in chapter 4.

Regarding the second question, resilience to whom? I consider this question with the cultural aspect. Recognizing culture itself can sometimes be a challenge. "Because cultural aspects are present at multiple levels of an organization, of a group, and of an individual, culture can be elusive and overlapping, which makes it difficult to 'notice.' " (Atun Girgin & Menoni, 2017, p. 16). Inspired by the comments of Atun and Menoni, the analysis of culture is extended to encompass different groups within the research. There is a need to categorize agents in order to capture the intersection of the role of culture. Therefore, the second question concerning ''Resilience to whom'' is approached through the examination of three distinct levels, each based on different scales: the individual level, the community level, and the institutional level. understanding the interplay among various agents, whether it involves cooperation or conflicts, is key. It helps in distinguishing that resilience is not a universal concept applicable uniformly to all in the system. By considering these multiple levels, this research aims to capture a more comprehensive perspective of wind resilience on the Penghu archipelago and its implications for individuals, communities, and institutions.

Spatiality and temporality matter

Besides these two fundamental questions: Resilience for what? Resilience to Whom? It is crucial to emphasize the significance of both spatial and temporal aspects when defining the boundaries of a system in relation to disturbances and stressors. Precisely defining the system boundary is essential to effectively address these inquiries. To define the objective system, the first elements are spatiality and temporality. Spatiality and temporality are the core to understanding the geographic processes (Yao, 2003), and the culture involved. The temporal aspect holds particular importance as it encompasses the core concepts of resilience, including the evolution and transformation of adaptations, learning processes, and perceptions over time. Likewise, the spatial aspect plays a vital role in understanding how adaptations manifest in the landscape and the effects of perceptions on behaviour. These dual considerations provide a comprehensive understanding of the intricacies involved in resilience research.

2.2 Key concepts around resilience

In this section, I clarify four key concepts related to resilience. As resilience is central to this research, these four concepts serve to enrich our understanding of the research framework. Moreover, elucidating these sometimes ambiguous concepts aims to enhance the precision of scientific description. The following four concepts are adaptation, learning, perception and group notions of risk, disturbances, and stress.

The central focus of this dissertation revolves key concepts within the context of social-ecological resilience. As mentioned by Berkers, *''Learning and adapting based on an accumulation of ecological knowledge, often following a perturbation... people and societies are capable of learning from experience, modifying their decisions and rule sets, and passing their knowledge on to others''* (Berkes & Turner, 2006, p. 490). Scientists have observed that learning and adaptation are two key concepts that contribute to resilience and facilitate the functioning of systems.

The choice of adaptation and learning as central concepts for resilience stems from the primary objective of this research: understanding the role of culture in shaping responses to winds on the Penghu archipelago. Adaptations are evident as cultural expressions

representing the accumulated and experiential knowledge passed down through generations on the Penghu islands to effectively confront wind-related challenges. Viewing resilience as an ongoing process as mentioned in the last section, characterised by learning to become more resilient in order to survive stress and disturbances, illustrates the dynamic nature of resilience, which is essential for maintaining the system's functionality.

Moreover, the abductive reasoning process (see Chapter 3) has played a vital role in examining the empirical data and evaluating its alignment with conceptual frameworks. This research aims to explore the cultural significance of wind resilience on the Penghu archipelago, as culture manifests itself in both spatial and temporal dimensions. Through this iterative approach, the analysis of empirical evidence has informed and guided the selection of adaptation and learning as the central foci of this study. Thus, adaptation and learning have been selected as the central themes to be further elaborated upon in the subsequent paragraphs.

2.2.1 Adaptation

The interchangeable usage of the terms adaptability and resilience has been observed in previous research reciprocally (Walker et al., 2002). This interchangeable usage has led to additional confusion in the field of resilience studies. Hence, it is crucial to establish a clear understanding of the relationship between these two terms. According to Walker (Walker et al., 2004) within a Social-Ecological Systems (SES), adaptability refers to the collective capacity to manage resilience. Thus, adaptability is an integral part of resilience, representing the cumulative strategies employed to enhance resilience. In this context, adaptability can be defined as *''The capacity of a system to adapt in order to be less vulnerable…It is shaped by the interaction of environmental, social, cultural, political and economic forces that determine vulnerability through exposures and sensitivities, and the way the system's components are internally reacting to shocks''* (Gitz & Meybeck, 2012, p. 20).

2.2.2 Learning

The concept of learning, like many other terms employed in resilience research, lacks a precise definition. However, its significance as a foundational principle for enhancing resilience is consistently emphasised (Berkes & Turner, 2006; Ruiz-Mallén et al., 2022; Uddin et al., 2020).

The acknowledgement of learning as a fundamental aspect in fostering resilience and addressing uncertainty within Social-Ecological Systems (SES) dates back to the late 1970s (Biggs et al., 2012). It is important to note that learning involves multiple agents, extending beyond individuals to encompass institutions and societies. According to Berkes, learning to live with change and uncertainty is a crucial capacity that enables the improvement of resilience in times of crisis (Berkes & Seixas, 2005).

Furthermore, the integration of diverse types of knowledge for learning purposes is a vital factor to consider. In this regard, traditional practices play a significant role in the generation, accumulation, and transmission of knowledge aimed at effectively dealing with stressors (Berkes et al., 2000). Knowledge is the important factor during the learning process and adaptation, as Berkes mentioned, *''learning and adapting based on an accumulation of ecological knowledge''* (Berkes & Turner, 2006, p. 490).

This research examines the learning process among agents throughout different periods, spanning from the late 19th century to the present. Specifically, the research aims to investigate the mechanisms of knowledge generation, accumulation, transmission and disappearance within these temporal and cultural contexts.

Besides adaptation and learning I explained above, this research emphasises clarifying the terms disturbance, stressor, and risk. By precisely defining these terms, I can discern their distinct roles and impacts on the system, thus preventing vagueness.

2.2.3 Disturbances, stressors and risk

The definition of resilience is consistently associated with disturbance or stressors. However, a majority of papers employ these terms interchangeably without providing a precise definition. This research aligns with Borics's conclusion (2013), advocating for the differentiation of disturbance and stressors based on their frequency. Disturbances are events that enable the variable to reach a dynamic equilibrium, whereas stressors prevent a return to pre-event dynamics and lead to a shift towards a new trajectory (Borics et al., 2013). In the context of this dissertation, disturbances refer to interferences that the system can absorb or cope with, while stressors may cause the system to break down and undergo changes. My alignment with Borics is primarily due to the specific situation in Penghu. Penghu experiences long-term monsoons as disturbances and typhoons as stressors. This research

examines adaptations to these two types of wind. Consequently, I differentiate between disturbance and stressor to facilitate a more precise analysis.

It is worth mentioning that, in addition to disturbances and stressors, another related concept is risk. The clarification of these three terms is essential in this research. Risk science has had its historical background since the 1920s traced back to the economic perspective by Knight's definition of risk as measurable uncertainty (Knight & Jones, 2002). The definitions and applications of risk cross disciplines as resilience discourse. The numerous definitions are formed with different words but basically share a similar idea about the nature of risk: *''The consequences of the activities and associated uncertainties''* (Aven & Renn, 2009, p. 1).

While scholars argue that risk and resilience should not be arbitrarily separated and even proposed an integration (Logan et al., 2022; Mochizuki et al., 2018), the opposing opinion contends that both concepts need to be independently managed (Linkov et al., 2014, 2018). Despite the bifurcated opinions, there are two mutual understandings on the risk management and resilience discourse. First risk and resilience share different focuses, second how these two concepts are portrayed in resilience research. Moreover, when these two intertwined concepts are portrayed in a framework, they are often depicted with a system boundary dividing them. In other words, the majority of resilience literature tends to place risk outside of the researching system (Khan et al., 2023; Mochizuki et al., 2018).

Oppositely, the sociological perspective discusses risk culture and proposed risk is culturally constructed (Gerkensmeier & Ratter, 2018). Concepts of culture and risk emerged from the 1980s. Douglas and Wildavsky argued Perceptions of risk and concerns related to environmental or social issues are shaped by social and cultural contexts (Rippl, 2018). This implies that risk is not located external to the system, but is an inherent part of it. The integration of risk as a cultural concept further supports the notion that resilience itself is culturally embedded. By recognising risk as a culturally constructed phenomenon, I acknowledge that resilience is not a universal, one-size-fits-all concept, but rather a dynamic and context-specific process that reflects the values, beliefs, and practices of a particular culture.

The current research lacks clarity regarding the relationships among disturbances, stressors, and risk. As per the definitions and distinctions provided earlier, it is evident that

disturbance is distinct from risk, predictable and can be handled. Whereas stressor is more aligned with risk. The risk perspective primarily centres on the consequences of uncertainty, whereas stressors and disturbances pertain to the interference themselves.

2.2.4 Perception

In contrast to the previously mentioned concepts, perception initially held a peripheral position in the discourse surrounding resilience. Its origins can be traced back to psychology, from where it gradually found applications in various other disciplines. Since 1965, the study of environmental perception and behaviour in America has witnessed a diverse array of perspectives and styles (Buttimer, 1984, p. 251). This field of research gradually made its way into geography, as exemplified by the influential publication titled ''Environmental Perception and *Behavio*ur,'' issued by the Department of Geography at the University of Chicago in 1984. More recent literature has highlighted the significant role of perception in influencing resilience, decision-making processes, and behaviours (Guo et al., 2020; Ranjan & Abenayake, 2014).

Perception refers to *''an individual's or group's unique way of viewing a phenomena; involving the processing of stimuli; and incorporating memories and experiences in the process of understanding''* (McDonald, 2011, p. 7). Perception offers insight into how agents within a system perceive, experience, and comprehend disturbances and stressors.

It is worth mentioning that individual perceptions and responses to everyday life situations are also influenced by context and culture, with the operation of broader socio-cultural discourses playing a significant role (Henwood et al., 2008). In this research, perception plays a significant role as it enables us to comprehend the perspective of narratives from individuals, communities and institutions beyond solely focusing on the landscape and geographical aspects. By considering people's perceptions, this research gains valuable insights into how people interpret and interact with their environment, providing a more comprehensive understanding of resilience within the context of cultural and social dynamics. This emphasis on perception enriches the analysis, allowing for a deeper exploration of the cultural-oriented resilience framework.

2.3 A travelling concept resilience discourses in the academia of Taiwan and China

The decision to compare the dissemination of the concept of resilience, particularly in relation from the Western to Eastern contexts, is influenced by the author's position as a resilience researcher who works in Europe with an understanding of Chinese publications. The purpose of this section is to investigate the theoretical understanding of resilience as used in Asia, especially focusing on Taiwan and China. The Penghu archipelago, the case study of this research, is situated in the Taiwan Strait, between China and Taiwan. My interest lies in understanding the dynamics of how the Western concept of resilience has been disseminated within the Eastern academic sphere and how it has been applied in Eastern case studies.

To comprehend the transmitted concept of resilience, it is necessary to establish a perspective for framing this analysis. To start this, I introduce the travelling concept, as initially coined by Edward Said in 1988. The travelling concept describes how a concept disseminates from a situation or place to another area or culture (Frank 2009; Harding 2019). It mentions four discernible and recurrent patterns when a theory or an idea travels. First, in initial circumstances, the idea enters the discourse. Second, distance transverses to new prominence. Third, there is acceptance and resistance to the set of conditions in a new area. Fourth, the now full or partly accommodated or incorporated idea. Sometimes it is transformed to a new use and position in a new time and place (Said 1983:227). These patterns provide a procedure to examine how a theory travels to another region.

In preparation for applying the travelling concept to examine resilience in the research topic, I will undertake the following steps in this section. Firstly, a thorough review and characterisation of relevant academic publications from Taiwan and China will be conducted. Secondly, identifying and analysing the differences in the usage of the term resilience between these two regions. Lastly, exploring the various fields in which the term resilience has been applied in Asia within the context of academic studies. The method employed involves examining published peer-reviewed papers, governmental reports, and academic books, thereby facilitating a comprehensive understanding of how resilience is applied in the academic landscape of Asia.

2.3.1 Resilience discourses in Taiwan

The literature displayed in this section has mainly been collected from Airiti Library, the biggest database of academic journals published in Taiwan. It collects quality academic

journals in Chinese or English that were published in Taiwan, China, the U.S.A., Hong Kong, and Malaysia. After using the keyword search for ''Resilience'', I retained those papers that are indexed in the Taiwan Social Sciences Citation Index (TSSCI). TSSCI refers to the core journals in Taiwan. It is a ranking system which is held by The Research Institute for the Humanities and Social Sciences. Its purpose is to identify high-quality academic journals. From 2007-2020, there are 9 papers selected (Chen and Tien 2017; Hsiao and Hsu 2015; Jang 2009; Lee et al. 2013; Lin and Ching 2015; Pei-Wen 2014; Shen and Lu 2017; Song, Lin, and Tu 2018; Wu and Huang 2011). Selections are according to whether the papers discuss or define the essence of resilience.

Table 1 presented below provides a scenario illustrating the descriptions of resilience, shedding light on the resilience concept travelled from Western publications to Eastern publications. The "*" asterisk means the paper is not listed in Taiwan Social Sciences Citation Index (TSSCI). Through this examination, five significant phenomena come to the forefront. Firstly, recent research conducted in Taiwan within the last decade predominantly revolves around resilience's relationship with vulnerability, with many papers drawing comparisons between resilience and vulnerability from Western scholars' perspectives. In most cases, resilience is employed as a term subsumed within the broader concept of vulnerability. Furthermore, when referenced in these papers, resilience frequently be used as a conceptual framework, offering a theoretical basis for empirical case studies, but not for the theoretical discussion. For example, resilience is often utilised as a framework for creating indices to assess resilience capacities at regional or national levels.

Compared to multiple definitions of resilience in Western academic circles, the definitions in Taiwan are relatively homogeneous. Frequently cited authors in this context include W. Neil Adger, Carl Folke, and Brian Walker. Scholars within Taiwan can be categorised into two factions concerning their definition of resilience. One faction perceives resilience as a subset of vulnerability (Wu and Huang 2011:199), while the other defines it independently from vulnerability, emphasising its strong connection to adaptation and learning from experiences. The latter group posits that a system, following a perturbation, will not simply recover and return to its original state but will instead reorganise into a new multi-dynamic equilibrium.

Topic	Phenomena
Focus	Most published studies mainly focus on vulnerability instead of resilience.
Case studies	The concept of resilience is a framework used in empirical case studies to create indices of resilience.
Trend	Resilience has been used as a catchword in Taiwan since the 2010s.
Definitions	The definitions of resilience in Taiwan academic circles mainly borrow from Western papers.
Application	Resilience as a term is mostly applied in Taiwan in the field of psychology.

Table 1 Five Phenomena in Taiwanese papers

Following the phenomena presented above, several questions arise. Firstly, it is essential to consider whether the Western definition of resilience, as observed in the Taiwanese context, is suitable and meaningful when applied to case studies within Taiwan. The appropriation of the Western concept is rarely refined and considered in the local context. The table presented below provides an overview of the descriptions of resilience within the context of Taiwan. The descriptions have been translated from Chinese to English for analysis. The categorisation of resilience into sub-categories, meanwhile, Table 2 lists the core citations for reference.

Resilience categories	Source	Key Citation	Description
Resilience	(Lin and Ching 2015:70)	(Adger 2006; Folke 2006; Holling 1973; Miller et al. 2010; Turner 2010)	The core concept of resilience theory has shifted from what the ecological community talked about in the past: "the system can absorb shocks or restore to the state before being disturbed," to "the system can change the content of the system through learning and re-organization".
Resilience	(Hsiao and Hsu 2015:64)	(Adger 2000; Mehrotra et al. 2011)	The resilience index, like the vulnerability index, has a basic structure that includes aspects and abilities related to the capacity of

			the social environment to restore its original functionality after being disturbed by natural disasters. These aspects encompass economic capacity, access to food, maintenance systems (such as water supply and electricity), construction projects, medical treatment, and more.
Disaster Resilience	(Lee et al. 2013:190)*	(Dunning 1999; Manyena 2006; Paton, Smith, and Violanti 2000; Yusuf and Francisco 2009)	Resilience shows a positive correlation with its values and encompasses four key aspects: disaster reduction ability, preparation ability, strain ability, and reconstruction and recovery ability. Resilience primarily pertains to the capacity to respond effectively to disasters.
Disaster Resilience	(Jang 2009:32)*	(Paton and Johnston 2006)	Disaster resilience involves leveraging intrinsic resources within an individual or community to sustain or recover their pre-disaster level of functionality, irrespective of the disaster. It represents the ability of survivors to persevere in the aftermath of a disaster.
Disaster Resilience	(Wu and Huang 2011:199)	(Gallopín 2006)	Resilience is defined as a sub-component of vulnerability.
Social Resilience	(Song et al. 2018:19)	(Adger 2000; Berkes 2007)	Resilience, as a constituent variable of vulnerability, is believed to determine the degree of vulnerability of a system to external pressures. Resilience has a very close

			relationship with coping capacity and adaptive capacity.
Urban Resilience	(Shen and Lu 2017:124–25)	(Bartelmus 2013; Fleischhauer 2008; Folke 2006; Godschalk 2003; Gunderson 2000; Walker et al. 2004; Walker and Salt 2012)	In the 1990s, research on urban resilience primarily focused on improving the physical environment and engineering technology to prevent disasters. It was not until the 2000s that the abilities of "adaptation" and "recovery" became important aspects of urban resilience. Resilient cities are characterized by their ability to self-sustain and self-organize within their environment and interpersonal networks in response to unpredictable disturbances.
Urban Resilience	(Pei-Wen 2014:50–51)	(Davoudi et al. 2012; White 2010)	The implications of the notion can vary depending on the focuses, interests and training backgrounds of actors involved in policy-making. Confusion may occur due to different interpretations of the notion. As a result, although the word resilience is more commonly used, how spatial planning is used to promote the concept seems still questionable.
Regional Economic Resilience	(Chen and Tien 2017:5)	(Boschma 2015; Pike, Dawley, and Tomaney 2010; Simmie and Martin 2010;	The regional study or economic geography tends to understand regional economic resilience from the perspective of adaptation or adaptability, which advocates regional economic resilience as the ability of a system to adapt its structure and function in response to impact, Which includes the ability to resist

		Skålholt and Thune 2014)	impacts, the ability to recover or re-orientate, and even involve the ability to transform.
Community Resilience	(Li 2019:68)*	(Boschma 2015; Cutter et al. 2008)	There are three perspectives of resilience, one is "recovery", referring to the ability to respond to disaster events, emphasizing maintenance, recovery, and the return to the state before the disturbance. The second is the "adaptation" point of view, focusing on absorbing shocks and coping with incidents, learning the adaptation process to deal with disasters, and enhancing the original state. The last one is the "pre-planning" point of view, preparing and planning for the event to restore and adjust the system.
Community Resilience	(Tseng and Wu 2020:6)	(Cutter 1996; Gunderson and Holling 2002; Norris et al. 2008; Ronan and Johnston 2005; Walker, Salt, and Reid 2006)	There are three perspectives of resilience, one is "recovery", referring to the ability to respond to disaster events, emphasizing maintenance, recovery, and the return to the state before the disturbance. The second is the "adaptation" point of view, focusing on absorbing shocks and coping with incidents, learning the adaptation process to deal with disasters, enhancing the original state. The last one is the "pre-planning" point of view, preparing and plan for the event to restore and adjust the system.

Table 2 Concept of resilience as used in Taiwan.

Some Taiwanese researchers pointed out similar concerns, *''Apart from empirical statements, few studies directly propose what is the most important mechanism on resilience and adaptability in Taiwan from theory and thinking. The main root is our insufficient*

understanding of the development process of vulnerability and resilience theory, and just cited the ''latest'' research abroad'' (Lin and Ching 2015:69). Shaw and Wang also pointed out the same problem: *''Existing vulnerability research mostly focuses on the vulnerability defined by IPCC (2007, 2014), through the sensitivity and exposure factors to assess potential disaster impact, there is a lack of research on vulnerability from the perspective of adaptability or resilience'' (Shaw and Wang 2018:63).*

The decision to merge vulnerability and resilience discourses in Taiwanese scholarship reflects the challenges faced by Taiwanese scholars when confronted with a heterogeneous array of resilience definitions. This difficulty may originate from an urgent need to address existing problems, prompting Taiwanese scholars to adopt a trendy approach to handle the concept of resilience, the anxiety of connecting with the Western academy contributes to the phenomena. Another possibility is the pressure to publish peer-reviewed papers as a means of survival in academia and the inclination to align with new and promising buzzwords.

This perspective allows for the reference and citation of resilience definitions, primarily followed by Western publications, to enhance empirical studies and create evaluation indices where sub-components related to vulnerability and resilience can be randomly combined as contributing factors to the index. In essence, the precise definition of the concept of resilience is seldom pointed out at a central position in Taiwanese academic discourse.

I would like to pose a question here: Can Taiwanese scholars not only follow the knowledge of Western scholars but also explore a more appropriate and locally grounded perspective of resilience? In Taiwan, people have inhabited an island for generations where typhoons, earthquakes, floods, and mudslides are common occurrences. Could Taiwanese scholars learn from the experiences of local residents to gain a deeper and more culturally localised perspective on the concept of resilience (Pan, Lin, and Lin 2016)?

To reveal the reason why Taiwanese scholars follow the trend of Western academia. One could critique the entire academic system and its Western dominance. With English as the primary academic language that governs the production and dissemination of knowledge, Eastern scholars often encounter orientalism and a tendency to view Western concepts as more prestigious or valuable. Trained in such an academic environment, it's clear that

academics may prioritise the adoption of Western concepts rather than the development of their own. It's evident that changes are needed in academia, particularly in the way scholars are trained, to overcome these barriers.

2.3.2 Resilience discourses in China

The second part of the resilience concept in Aisa focuses on the discourse of resilience in China, where I analyze academic papers published within China. Unfortunately, I encountered limitations in accessing the Chinese Science Citation Database Core (CSCD) due to data protection regulations. Consequently, I turned back to the Airiti Library, which provides access to research papers classified under the CSCD system. CSCD is a bibliographic database and citation index, established in 1989 through a collaboration between Clarivate and the Chinese Academy of Sciences. It holds the distinction of being the first non-English database integrated into the Web of Science. In the table presented below, I outline the overall descriptions of resilience within the academic discourse in China.

CSCD is a bibliographic database and citation index established in 1989 through a collaboration between Clarivate and the Chinese Academy of Sciences. It holds the distinction of being the first non-English database integrated into the Web of Science. Between 2005 and 2010, a total of 8 papers addressed the concept of resilience (Ge et al. 2010; Liu, Fang), et al. 2006; Shi et al. 2007; Sun, Wang, and Yang 2007; Wan et al. 2010; Wang et al. 2006, 2008; Wang, Yang, and Liu 2010). In Table 3 below, I provide an overview of how resilience is described within the academic discourse in Chinese circles.

Topic	**Phenomena**
Focus	Most published studies mainly focus on vulnerability instead of resilience. Yet the amount of papers that take resilience as the main topic is less than in Taiwan.
Case studies	The concept of resilience is a framework used in empirical case studies to create indices or models of resilience.
Trend	Resilience is a topic which is used in disaster management or geography field.
Definitions	The definitions of resilience in Chinese academic circles mainly borrow from Western papers.

Application	Resilience as a term is mostly applied in China in the field of psychology, and engineering. It's a trend of using resilience in these two disciplines.

Table 3 Five phenomena in Chinese papers

Based on my literature review, Chinese scholars began to show interest in the concept of resilience around 2006. Table 4 outlines the various ways in which resilience is conceptualized within Chinese academic discourse. Please note that papers marked with an "*" asterisk were not listed in the Chinese Science Citation Database Core (CSCD) It's important to acknowledge that this paper utilized the Airiti library to filter papers, with a focus on high-impact factor journals in China and Taiwan. Consequently, some papers not included in the CSCD in China and TSSCI in Taiwan may have been omitted from this analysis.

The seminal work that organised the exploration of this concept and introduced it to the Chinese academic community was conducted by Liu et al. in 2006. Liu et al. proposed several fundamental questions surrounding the concept of resilience, questions that were already being discussed extensively in Western academic circles. These questions included: How can a scientific definition of resilience be formulated, and how can a reasonable conceptual model be established? What factors influence the resilience of a region? Why do some regions exhibit higher resilience while others have lower resilience levels? How should the spatial scale for resilience research be determined? What characterises a post-disaster recoverable social system, and how can it be measured? How does social resilience change over time, and how can it be maintained and enhanced? Additionally, what risk reduction behaviours can effectively enhance disaster resilience? (Liu, Shi, et al. 2006) It's noteworthy that many of these questions remain topics of ongoing debate in contemporary research. In a comparative context, Wan noted that resilience had become a prominent concept among Western scholars, but it had received relatively little attention from Asian scholars at that time (Wan et al. 2010).

Resilience sub categories	**Author**	**Key Citation**	**Description**

Resilience	(Wang et al. 2008:14–15)	(Adger 2000; Berkes 1998; Holling 2001; Pimm 1984; Walker et al. 2002)	Resilience is a property of these linked social-ecological systems (SES). When resilience is enhanced, a system is more likely to tolerate disturbance events without collapsing into a qualitatively different state that is controlled by a different set of processes.
Social-Ecological Resilience	(Sun et al. 2007:5375)	(Carpenter et al. 2001; Gunderson and Holling 2002; Holling 1973; Walker et al. 2002)	Resilience is the magnitude of interference, which is the size of the system that can withstand interference before the social ecosystem enters a stable state-controlled.
Social-Ecological System Resilience	(Wang et al. 2010:1385)	(Adger 2000; Folke et al. 2010; Gunderson and Holling 2002; Walker et al. 2002)	Resilience refers to the capacity of a system to absorb disturbance and reorganize while undergoing changes, so as to retain essentially the same function, structure, identity, and feedback. At present, most of the research on resilience remains qualitative and conceptual descriptions, lacking empirical case studies on the operability of resilience.
Engineering resilience vs. Ecological resilience	(Ge et al. 2010:120)*	(Holling 1973; Pimm 1984)	Relatively speaking, ecological resilience emphasises the persistence, variability and unpredictability of the system. ...In fact, the difference between engineering resilience and ecological

			resilience comes from the fact that system stability is different: the former emphasizes the maintenance of functional effectiveness, while the latter emphasises the continuation of system functions.
Disaster Resilience	(Wan et al. 2010:22)	(Gurabardhi, Gutteling, and Kuttschreuter 2004; Liu, Shi, et al. 2006)	Disaster resilience is an important part of disaster research. It responds differently to the environment, economy, and human society after risks. Through qualitative or quantitative research, analysing the change process of different receptors after disasters occur, to lay a foundation for better prevention, treatment, and repair of possible losses caused by disasters.
Regional Disaster Resilience	(Shi et al. 2007:48)	(Shi 1996)	Regional disaster resilience depends mainly on the ability of social emergency recovery and reconstruction. The emergency capability depends on the safety construction level and emergency response capability of the jurisdiction. Reconstruction depends on the ability of the government and society to provide assistance. With the ability to transfer disaster risks.
Regional Disaster Resilience	(Liu, Fang), et al. 2006:56)	(UN 2002)	Resilience describes the system's ability to resist stressors and return to its original state.

Regional Disaster Resilience	(Wang et al. 2006:24)	(Holling 1973)	Resilience describes the ability of a system to withstand stress and return to its original state.

Table 4 Concept of resilience as used in China.

Wan et al. also highlight the existing gap between Asia and Western countries in research on resilience. They note that research in the field of disaster resilience is continuously evolving, with increasing attention from experts and scholars towards understanding the occurrence and development of environmental disasters. The volume of literature on disaster resilience is growing each year. However, there is a notable discrepancy in the level of attention given to disaster resilience by scholars in North America and Western Europe compared to scholars in Asia. In the context of how resilience is applied in China, there is an additional noteworthy phenomenon. Most Chinese scholars employ mathematical methods to construct models of resilience. In contrast, Taiwanese scholars tend to develop indices for assessing the resilience capacity of regions or communities. Exploring the reasons behind these differing approaches and their potential consequences could be an interesting area for future research, although it falls outside the scope of my current focus. Towards the end of this section, I will delve into a comparative analysis of the resilience discourse between Taiwan and China.

2.3.3 Comparison

After describing and characterising research on resilience as it has been conducted in Taiwan and China. Using the main citation indices of these two countries and analysing the main publications on resilience indexed by these citation indices, I could make the following observations.

First, in Taiwan, the notion of resilience has been imported from 2009 (Jang, 2009), Jang was trained in sociology at the University of Denver in the United States. This is the first paper that introduced the concept of resilience for Taiwanese academia. The topic is disaster resilience on the community scale. After this pioneering paper, resilience became a catchword after the 2010s, and communities as a measurement still keep the domination of the research of resilience. In the wider context of vulnerability research, resilience was put in a different perspective such as a subset of vulnerability, or it is independent from it. The latter is more accepted by the Taiwanese scholars. Yet these definitions are duplicated by the point

of view of Western scholars, attempts to redefine or critically approach the definition have been barely made. Like a concept taken from a shelf in a supermarket, or sometimes like a buzzword, the notion of resilience has been attached to studies without exploring the meaning facets or relevance of the term. Last, though scholars noticed the broad concept may not fit the local context, currently no papers are focused on bridging the gap.

In conclusion, it is intriguing to note that the four patterns identified by Said do not align perfectly with the dissemination of the concept of resilience from Western to Eastern contexts. While observing acceptance of the concept, there has been a lack of resistance detected. This phenomenon raises concerns regarding academic hegemony, although it falls outside the scope of my research. As a bilingual researcher, I can only express frustration regarding this issue. However, it is important to highlight that while acceptance is the prevailing trend in the resilience discussion, it does not imply complete alignment. Scholars in Taiwan and China have reflected on the need to adapt the Western concept to suit the local context. This is the point of this research offers, to suit the local context need to consider culture in the resilience research. I will explain it in the next section.

To sum up, resilience has predominantly been applied as a travelling theory in the context of disaster studies in Eastern academia. It serves as a framework for analyzing case studies within this domain. However, in line with this utilization, resilience has become a mechanistic tool, losing some of its original flexibility and deep theoretical thinking. As Edward Said aptly commented regarding travelling theories, their (theory) origins and history of adversarial derivation may dull critical consciousness (Said 1983:247). After three decades of resilience entering the Eastern academic system, it has been criticised for shirking responsibility from the social structure. This criticism highlights the need for a more comprehensive and systemic point of view of resilience.

Upon reflection and considering the issues discussed regarding resilience as a travelling theory, it becomes evident that there is a need to localise and systematically think about resilience. These observations can serve as valuable hints for developing a framework that addresses the weaknesses identified. One potential approach is to focus on culturally oriented resilience, which emphasizes the integration of local cultural contexts and perspectives into resilience practices. By incorporating cultural factors into the

conceptualization and application of resilience, it becomes possible to enhance its effectiveness and relevance in diverse settings.

2.4 Missing culture in resilience discourse

From mining into the literature review, we found that the cultural aspect is missing in the current resilience discussion.

2.4.1 The recent resilience discourse mentioned cultural perspective

The analysis of the Web of Science Core Collection for publications in the past five years (2019-2023), using ''culture'' and ''resilience'' as search keywords, reveals that the dominant discipline covering these two keywords is psychology (Ungar, 2013; Zheng et al., 2020). However, it is worth noting that while numerous publications address various categories of resilience, only a limited number of them specifically focus on the role of culture in the discourse of resilience. There are only seven papers covering two dimensions of resilience and culture (Bocci, 2022; Bomhauer-Beins et al., 2019; Davis et al., 2021; P. S. S. Lin & Lin, 2020; Martinez, 2021; Mori et al., 2019; Xie & Wong, 2021). This observation highlights a research gap and emphasizes the need for more studies that explicitly examine the intersection of culture and resilience. In recent resilience research, besides debating on operationalising, measuring and evaluating resilience, recent developments in resilience research have highlighted the need for cultural perspectives regarding risk management. Culture is mentioned as necessary in several published papers (Adger, 2000; Adger et al., 2013; Arora-Jonsson, 2016; Bomhauer-Beins et al., 2019; Uddin et al., 2020), however, it is still deficient in the systematic point of view on ''how'' & ''why'' culture is imperative. Therefore, this research aims to answer these two questions.

As discussed previously, scholars have recognized the importance of considering the local context in conceptualizing resilience. This acknowledgement implies that resilience as a conceptual discourse requires an understanding of the specificities of the local scale and the incorporation of cultural perspectives. By recognizing and incorporating the local context and cultural factors, the conceptualization and application of resilience can be more effective and relevant to the specific circumstances and challenges communities and regions face. *''Many*

of the resilience frameworks reviewed have not yet been tested empirically'' (Bosetti et al., 2016, p. 6). This highlights the need for a culturally sensitive and context-specific approach to resilience research and practice.

Therefore, having highlighted the significance of culture in the aforementioned context, this research identifies a crucial gap, wherein culture is often overlooked in resilience research.

2.4.2 What is culture?

The cultural perspective in resilience research involves recognizing and examining the influence of cultural factors on resilience, meanwhile emphasising the importance of culture. It acknowledges that culture plays a significant role in shaping individuals', communities' and institutions' capacities to cope and recover from disruptions to specific disturbances and stressors. However, what is culture? Culture is a tough question as mentioned by Harrison: *''Culture is difficult to deal with both politically and emotionally. It is also difficult to deal with intellectually because there are problems of definition and measurement and because cause-and-effect relationships between culture and other variables like policies, institutions, and economic development run in both directions''* (L. E. Harrison, 2001, p. xxxii). Culture encompasses various elements, including beliefs, values, norms, social practices, and knowledge systems shared within a particular group or society (Frese, 2010; Groh, 2019, p. 216). It can be defined as *"Culture is the socially transmitted knowledge and behaviour shared by some group of people"* (Peoples & Bailey, 2012, p. 23) Or, as Schein mentioned, *''Culture is the set of shared attitudes, values, goals, and practices that characterizes an institution, organization or group''* (Schein, 2010, p. 5).

In this dissertation, the focus is not on a broad discussion of culture without limitations. Instead, the primary emphasis is exploring cultural responses contributing to resilience. In my understanding of culture in this research, I define culture as a set of cultural practices and cultural operations. Further explanation about cultural practices will be provided in the next section. These cultural responses are characterised by being culturally embedded within the agents involved. This means, that within the social examples of such responses include adaptations, the learning process, and the perceptions that are mentioned in the last section. By narrowing the scope to cultural responses but culture as a whole in general aimlessly, these selecting foci provide an analysable perspective on cultural importance in resilience research.

2.4.3 A definition of resilience from the cultural perspective

Since culture is missing in the current resilience discourse, this research first distinguishes what the cultural perspective is in resilience study. After this clarification, the second step is the core of this research, which creates the concept of culturally oriented resilience.

The definition of resilience in this dissertation aligns with the CUORE project (Cultures of Response: A cross-cultural comparison of resilience to storms in the Penghu archipelago and the East Frisian Islands), funded by the German Research Foundation (DFG). CUORE defines resilience as the culturally contingent capacity of a system to respond to and learn from stressors affecting the system's functionality. Understanding this capacity requires defining the system's boundaries, spatial and temporal scales, as well as the agents and actors and comprehending their complex behaviour (CUORE research team, 2021).

The definition of resilience emphasizes the cultural perspective of resilience. The cultural contingent capacity of a system is emphasized. Cultural contingent capacity means that the capacity is embedded within the cultural context, which is an integral part of a system. Cultural contingent includes culture's components, encompassing symbols and material perspectives. Additionally, spatial and temporal perspectives are essential considerations. In my understanding, the cultural perspective on resilience means taking culture into account to observe the existence of resilience. Culture presents in spatial, temporal, symbols, and material dimensions.

Secondly, responding and learning are identified as two key actions for building resilience among agents within the system. Responses in this context encompass adaptations and perceptions in response to specific stressors. The learning process refers to agents learning from their experiences and leveraging various forms of knowledge to navigate disturbances and stressors. It's important to note that, as mentioned previously, stressors and disturbances are two distinct notions distinguished in the earlier section 2.2.

In this dissertation, integrating the cultural perspective into resilience thinking thereby introduces the concept of culturally oriented resilience. The focus is explicitly on responses, such as adaptations and perceptions, as well as the learning process, considering spatial and temporal perspectives. By adopting this contextually grounded approach, this research seeks

to provide a comprehensive framework for examining the role of culture in resilience. In the subsequent sections, two notions will be introduced as analytical tools to further explore the cultural dimension that facilitates resilience.

2.5 Culturally oriented resilience

In this research, the proposal is made to emphasize the importance of considering a cultural perspective in resilience research. The dissertation seeks to address the "how" and "why" of the cultural perspective's significance in studying resilience. However, capturing the cultural perspective proves challenging due to the pervasive nature of culture itself, which is intricately intertwined within the entire system. Culture permeates all aspects, including every adaptation to wind resilience. If adaptations and culture are inseparable, how can the element of culture be extracted for the analysis of the cultural perspective to resilience research?

To address this challenge, two notions are introduced. The first is cultural practice, which serves as a means to observe the cultural perspective. Understanding the adaptations and responses of different agents to wind resilience is crucial in comprehending the cultural perspective. Additionally, delving into the motivations behind these cultural practices provides valuable insights.

The second notion is cultural operation, which complements the concept of cultural practice. While cultural practice focuses on capturing a certain moment of the action, cultural operation directs attention towards the temporal dimension. It recognizes that cultural practices are not static and extends to understanding the transformative processes that occur over time. Integrating both cultural practice and cultural operation ultimately contributes to a more comprehensive understanding of the role of culture in enhancing resilience. In the following text, two notions will be explained in more detail.

In short, I propose culturally oriented resilience as a framework that contains the two key notions mentioned above: cultural practices and cultural operations. In my understanding, culture is a set of cultural practices and cultural operations. These two notions are the way to answer how culture is manifested in the spatial, temporal, symbolic, and material dimensions.

2.5.1 Cultural practices

The objective of this research is to analyze the cultural perspective of wind resilience on the Penghu archipelago. This analysis encompasses visible adaptations to the wind in the landscape, perceptions of wind obtained through interviews, and historical archives to trace the wind resilience trajectory to examine wind resilience under cultural practices.

Cultural practice encompasses more than mere adaptation; it delves into the realm of understanding initial responses, the adaptive process, and the formation of adaptations themselves. Cultural practice goes beyond the surface-level observation of adaptations and aims to comprehend the underlying dynamics, motivations, and intricacies of the adaptive process. By examining cultural practice, a deeper understanding of how adaptations are shaped and their cultural significance in the context of wind resilience can be attained.

To effectively observe and analyse cultural practices, several attributes are taken into consideration. Since every cultural practice facilitates wind resilience on the Penghu islands. The first question is resilience to what? Therefore, I differentiate between wind types, the monsoon and typhoon as previously mentioned. Subsequently, I identify several attributes based on the respective wind type. Firstly, I explore the potential consequences associated with each wind type. Additionally, I investigate the motivations that drive agents to respond and act in the face of these consequences. I examine the specific adaptations that are employed. Moreover, I consider the temporal aspect, documenting the time period during which cultural practices are applied and whether they have persisted or disappeared over time. Lastly, I record the agents involved in these cultural practices as an additional attribute. These attributes in Table 1 below provide logical information for understanding the role of cultural practices in enhancing wind resilience on the islands.

Wind type	Potential consequence	Motivation	Practice	Tendency	Agents	Source

Table 1 Attributes for the cultural practices

In my understanding, cultural practices provide valuable insight for examining cultural models of enhancing wind resilience. However, it is important to note that cultural practices captured in this research do not account for temporal changes in cultural patterns. Instead,

cultural practices represent documented adaptations derived from fieldwork and archival sources, which have been analysed and organised into a cultural practices list, see section 5.3. Each practice is associated with a specific time point, still practising or disappearing. These observations offer a snapshot of cultural practices related to wind resilience without necessarily capturing the broader changes in cultural patterns over time. Therefore, cultural operations are needed, I will explain it in the next paragraphs-

2.5.2 Cultural operations

The proposed notion of cultural operation offers an essential complement to address the transitional aspects of cultural patterns. While cultural practice serves as a foundational component of cultural responses to wind, cultural operation focuses on the process of cultural production and transformation related to wind resilience in the empirical case. The core objective of the cultural operation is to examine the overarching patterns through which practices within a culture develop, ultimately shaping or altering the cultural dynamics related to wind resilience. Crucially, cultural operation considers the temporal dimension and focuses on the connections, and conjunctions among cultural practices. Therefore, cultural operation plays a role that filling the gap of overlooked "temporal perspective" on cultural practices.

Cultural practice forms the fundamental basis for cultural operation. At the operational level, this research begins by observing and documenting cultural practices, subsequently linking them across different time periods. The connective tool employed for this purpose included various elements such as policy, economics, societal norms, knowledge, etc. This analysis particularly emphasizes the formation and evolution of cultural patterns in relation to resilience to winds.

The last point of cultural operation I want to point out is that culture includes the material and non-material manifests. To facilitate the analysis of cultural operation, this research distinguishes between its material and non-material aspects. The non-material dimension, in particular, addresses the often-overlooked perspective of perception held by agents within the cultural context. By considering both material and non-material elements, a comprehensive understanding of cultural operation in the context of wind resilience can be achieved.

Conceptual framework

I employ the following conceptual framework (as depicted in Figure 2) to conclude this chapter. I position resilience as a normative concept and an ongoing process. Hence, temporality assumes significance. Furthermore, this research targets the geographical spatial setting of the case study of cultural importance to wind resilience on the Penghu archipelago. The system faces two distinct categories of perturbations. First are stressors, which represent unpredictable events such as typhoons. While second is disturbances exemplified by long-term interferences like winter monsoons affecting Penghu.

The green frame represents the social-ecological systems, encompassing both the social system and the ecological natural system in this context. SESs is defined as: *"a social-ecological system consists of a bio-geo-physical unit and its associated social actors and institutions"* (Glaser et al., 2008, p. 49). The yellow frame refers to the research framework of culturally oriented resilience, mentioned in section 2.5. In the Penghu case, both wind types intersect the social-ecological system and the framework of culturally oriented resilience because the assumption of this research is that both winds are partly culturally embedded. One of the aims of this research is to use culturally oriented resilience to examine how culture is embedded in the responses.

Within the system, I point out the key concepts around resilience. This includes adaptations, learning processes, and perceptions of wind and wind-related risks from identified agents (individuals, communities, institutions).

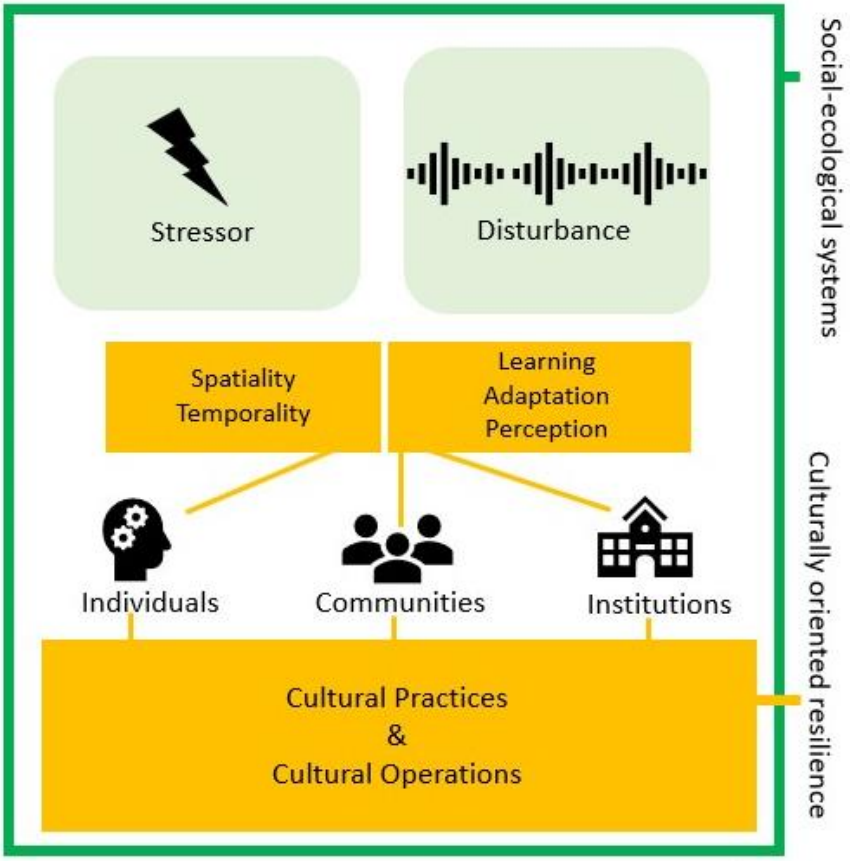


Figure 2 Conceptual framework diagram of this research

Chapter 3: Methodological Framework

''I do not know why I am here.'' I stopped to dig the tomb. Inserting the shovel I was given this afternoon into the earth. A professor is not far away from me, five meters away, excavating another tomb. It is over 30 degrees! I feel a sweat drop down to the earth from my forehead. I am neither a thief nor an archaeologist. I do not excavate the main part of the tomb. I try to remove the soil in front of the tombstone to recognise the inscriptions, and then digitalise it for the ThakBong database. I have no idea what it will bring to tomb research. I just collected 5 tombs for the whole afternoon of work, tomorrow we maybe return again. I feel extremely double exhausted when I got the thought. Prof. Streiter passed me a fresh purple cactus juice, he asked me how I am, I gobbled the whole bottle of juice.

October, 2016. My first encounter on Penghu, for digging tombs on islands.

''Could you please say again?'' Standing at the intertidal zone. Half of my shoes were socked in seawater. After asking three questions, I may get one answer. The rest of the two questions are ignored in the wind.

''What is interesting for researching winds? Wind is our daily life, nothing special. Don't you understand Penghu accents?'' An older woman, face covered by print fabric, is digging for searching shells in the intertidal zone with a small shovel.

She questioned my research topic and had no interest in talking to me. I stand beside them, trying to trigger some connections. Another woman came, apparently, they know each other. Starting the conversation and laughing together. ''Your harvest is better than mine.'' She looked into the shell bucket. I am not the person to hold the shovel this time, how to talk to people, what is the entry... The most frustrating interview I had maybe, maybe due to the first one.

I listen to the lost questions blow away in the wind.

March, 2022. field trip on Penghu, for interviewing the perception of wind.

As I contemplated which of the two prefaces to use as the opening for the methodology chapter, I looked back to the memorable moments of collecting data on Penghu. Two distinct experiences surfaced in my mind - the first being my initial encounter with the Penghu islands in 2016 and the second being the fieldwork undertaken for this dissertation in 2020. However, upon revising this chapter several months later, I gained a fresh perspective on the prefaces I had selected. It suddenly dawned on me that these two pieces were inextricably linked with the element of wind, a realization that had eluded me during my initial selection.

The first preface described a situation where the absence of wind exacerbated the scorching heat, causing me to feel lightheaded while working in the unforgiving heat. The second preface, in stark contrast, detailed a scenario where the wind was too strong so that people could not hear my questions. Through these prefaces, I came to appreciate the role of wind in shaping people's experiences on Penghu, both in its presence and absence. I noticed again how wind affects the daily experience on Penghu.

Normally, the methodology chapter is arguably the most personal section of a dissertation. This is not only because researchers cannot help but reflect on their positionalities but also because methods serve as a medium that connects researchers' interests and ideas with practical operations. The selection of appropriate research methods plays a crucial role in shaping the research questions and objectives of a study. While the methodology chapter in the final version of a research report may appear to be a seamless and uncomplicated process, the reality is that the decision-making process involved in method selection is iterative and dynamic. Researchers must remain open to modifying their initial plans in response to unexpected findings or developing research objectives.

Conducting research is a complex process that requires sensitivity and light touch, designing an appropriate methodology is no exception. Researchers are engaged in a quest to uncover new knowledge, and in doing so, they must carefully consider the objectives, methods, and analyses that will best enable them to achieve their research aims. Furthermore, the methods employed in a study are intimately linked to the research epistemology that the researcher subscribes to, and ultimately puts into practice. The research epistemology informs the choice of research methods and, in turn, shapes the findings and conclusions of

the research study. Therefore, the methodology chosen by the researcher must align with their epistemological stance to ensure the integrity and validity of the research study.

The current chapter aims to provide a comprehensive account of the methodology in this research. The structure of this chapter follows the research design that I adopted. In this chapter, I will reflect on my positionality as a researcher, highlighting the challenges and limitations that I encountered in the research process. Subsequently, I will justify the selection of particular research methods that I employed to address the research questions. I will provide a detailed description of the research methods and outline how data was collected and analysed.

Furthermore, I will demonstrate how these research methods have been effectively employed to address the research questions and contribute to attaining research objectives. By the end of this chapter, the reader will gain insight into the methodology employed in the research and understand how these methods have provided an analysable pathway for the current study.

3.1 Research framework and positionality

The research framework was established with the primary aim of exploring the contribution of a culturally oriented concept of resilience. In the conceptual chapter, I provided a clear definition of the term ''culturally oriented concept of resilience'', which refers to the consideration of culture as an empowering factor in resilience research. This definition is not only a theoretical statement but also practically applicable and analysable through the use of specific research methods, see Figure 3.

In line with the overarching research question: What is the role of culture in shaping responses to wind? A series of research questions were developed and outlined in the introduction. The research questions that were developed to guide the research process are as follows:

1. How do different agents adapt to the two types of wind on the Penghu archipelago?
2. What are the perceptions of winds among the people of Penghu?

3. What functions do the distinct agents play in wind resilience?
4. How does the notion of culture contribute to a culturally oriented resilience?

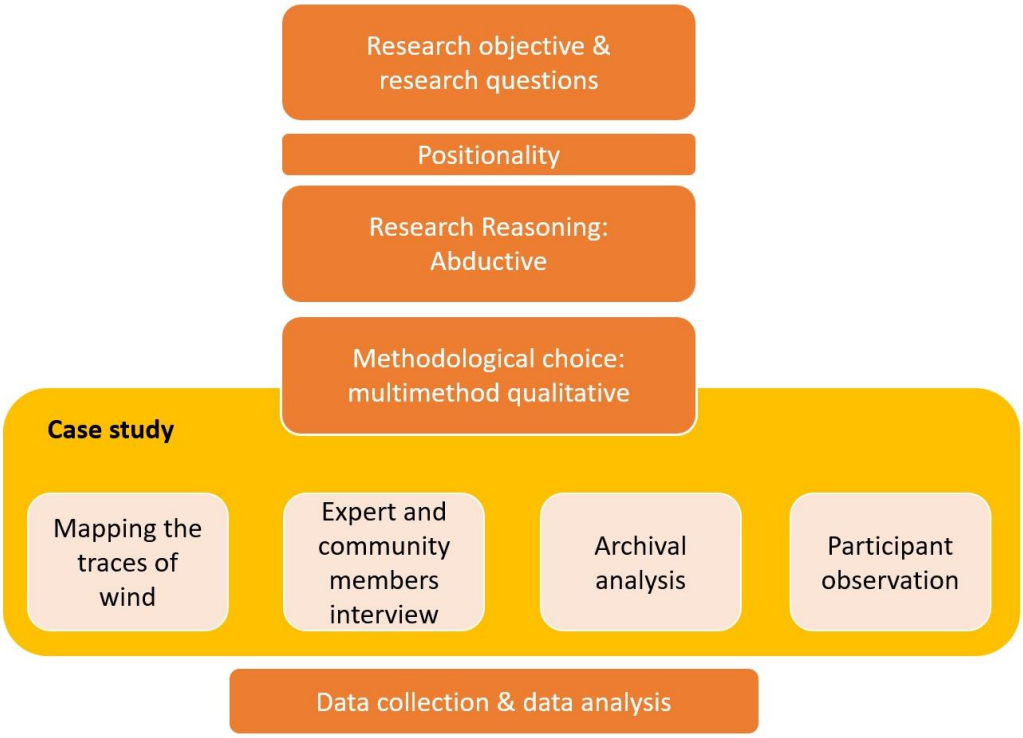


Figure 3 Methodological framework

3.1.1 Positionality

In addition to the research questions outlined above, my positionality as a researcher is also a decisive factor that impacts how I approach these research questions. Positionality refers to the researcher's subjective positioning in relation to the research topic (Qin, 2016). It involves the researcher's background, including gender, political and social background, and worldview (Berger, 2015; Holmes, 2020). Positionality plays a significant role in shaping the entire research process, from the formulation of research questions to data collection and analysis (Bourke, 2014). Therefore, it is crucial to acknowledge and highlight my positionality to ensure transparency and integrity of the research process.

I am Taiwanese, I was born on Taiwan's main island, and am studying resilience theory at the Institute of Geography in Germany. I am not originally from Penghu, I am an outsider. However, for Western readers, I am Taiwanese. I am an insider. This in-between position has led me to engage in reflective thinking, constantly questioning my role and positionality in this research.

In examining my positionality, reflexivity has been a critical tool. *''In Reflexivity involves a self-scrutiny on the part of the researcher, a self-conscious awareness of the relationship between the researcher and an "other" ''*(Bourke, 2014, p. 1). Through reflexivity, I have been able to acknowledge and explore how my personal background, experiences, and assumptions might influence the research process and outcomes. By being aware of these factors and reflecting on them throughout the research process, I can remind myself of the potential bias and respect the culture of the research location.

As mentioned above about positionality, researchers need to be aware of the emic and etic point of view, *''In taking the localist perspective towards interviews, researchers must also develop the skill of being able to step into and out of the research process''* (Qu & Dumay, 2011, p. 260). To be more sensitive to the awareness of the dynamic relations between researcher him/herself and others. Besides self-awareness, Berger (2015) gave a hint that there are strategies to minimise biases: discussing topics within a team (Berger, 2015). This is a useful tip to de-bias. In my own research, I regularly discussed the entire process with peers, which helped to prevent my thinking from becoming stuck in the mud of bias.

Furthermore, it is important to note that while the Penghu archipelago is a part of Taiwan, the people of Penghu have a distinct cultural identity that differs from other parts of Taiwan. As a Taiwanese, I share a common identity with the people of Penghu, but they have their unique perspectives, experiences, and cultural practices that I may not fully understand. For instance, the language culture differs between Taiwan Island and Penghu. When Penghu people talk about fish, the pronunciation is ''hû'' rather than ''hî'' as it is pronounced in most areas of Taiwan. During the research interviews, I encountered difficulties in understanding some of the Penghu accents, which required me to ask interviewees to write down certain words to ensure accurate data collection.

Such linguistic and cultural differences may present challenges in the research process but can be overcome through respectful communication and clarification. By acknowledging and embracing the unique cultural identity of Penghu, I can ensure that my research is conducted with sensitivity and cultural competence.

3.1.2 Inductive & deductive reasoning

After clarifying the positionality of this research, I can now introduce the research reasoning. There are two reasoning for forming this research. One is deductive and the other is inductive. Inductive reasoning starts with specific observations to form broader generalisations. Deductive reasoning tests the hypotheses with specific data, in order to confirm or reject a hypothesis (Bello et al., 2020). Each of them has a weakness. For example, inductive reasoning was criticized without the amount of empirical data (Nisbett et al., 1983) while deductive is judged in terms of the choice of appropriate theory.

Besides these two main reasonings, abductive reasoning exists. Abductive is a combination of inductive and deductive reasoning. It is a top-down and bottom-up approach, to find the best prediction (Bell et al., 2022) Abductive reasoning focuses on ''surprising facts or puzzles'' (Mitchell, 2018, p. 105). To answer the research questions, my cultural analysis needs both inductive and deductive reasoning because how I assume culture forms itself is a bilateral process. That means observing and understanding culture requires top-down and bottom-up efforts. In this research, the use of abductive reasoning is appropriate due to the combination of empirical findings and theoretical assumptions required to answer the research questions. This approach allows for a comprehensive analysis of the cultural phenomena under investigation.

Once a researcher clarifies her/his positionality and the research reasoning, the next step is the methods used. Given the dynamic and ever-changing nature of culture, it is imperative to employ research methods that allow for an in-depth exploration of culture and its relationship with the perception of winds. To understand perceptions, as Plays stated (1997), *''Qualitative researchers believe that understanding people's perceptions requires getting close to ''research participants'' or ''informants'' or ''collaborations''. You must spend time with them, get to know them, feel close to them,… ''* (Palys, 1997, p. 19). As such, this dissertation has opted for a qualitative research design as the main approach for investigating this topic. Under the umbrella of qualitative research, a range of methods can be utilized to suit the research needs. The specific methods chosen for this study will be discussed in the next section.

3.1.3 A case study, Penghu archipelago, Taiwan

This research is based on a case study. *''The Merriam Webster's dictionary (2009) more aptly defines the case study as an intensive analysis of an individual unit (as a person or community) stressing developmental factors in relation to environment''* (Njie & Asimiran, 2014, p. 37). The case study method was selected because this research seeks to investigate questions related to culturally oriented resilience and the manner in which culture can contribute to wind resilience. The case study method provides a means to bridge the gap between theoretical thinking and empirical observations. In this research, the case study method is utilized to focus on both synchronic and diachronic within-unit variance (Gerring, 2004), which entails observing wind resilience spatially and temporally on the Penghu Islands. This approach enables the investigation of how the cultural perspective influences resilience thinking in a specific region.

The chosen case study, the Penghu archipelago, presents a suitable context to observe and analyse cultural responses to wind resilience. The rationale for selecting Penghu as the research area is twofold: first, its unique exposure to wind-related disturbances and stressors, including monsoons and typhoons; second, the researcher's background and previous experience in studying island cultures, especially on Penghu. Acknowledging the fluid positionality between the researcher and the research subjects, considering the emic and etic points of view, this study maintains a reflective approach throughout the investigation.

In order to capture culturally oriented resilience on the Penghu Islands, this research uses a variety of methods. First, the archival analysis examines historical records related to wind resilience on the Penghu Islands. This method allows for a longitudinal analysis of wind resilience, exploring how it has changed over time and how historical events have impacted it. Second, GIS (Geographic information systems) mapping creates a visual representation of the landscape and its relationship to wind resilience. This method allows for a better understanding of the spatial distribution of adaptations for wind resilience and how different agents respond to wind in the physical environment. Third, expert and community member interviews are conducted to gain insights into the cultural perspectives on wind resilience. These interviews provide a deeper understanding of the ways in which local culture shapes and is shaped by wind resilience. Finally, participant observation is used to observe and

document how local people respond to wind resilience. This method provides a firsthand account of the cultural practices and behaviours that contribute to wind resilience on the Penghu Islands.

Overall, these methods are chosen because they offer a comprehensive and nuanced understanding of the relationship between local culture and wind resilience on the Penghu archipelago. By employing a multi-method approach, this research aims to provide a more complete picture of how cultural practices contribute to resilience. In the following sections, I depict the methods I choose in detail.

3.2 Multiple methods within a case study

Before introducing the chosen methods, it is important to provide an overview of the data collection process. The data was collected during two field trips to Penghu, the first in 2020, which lasted for two weeks, and the second in 2022, which lasted for three weeks. While these trips may appear to be relatively short, it should be noted that I have visited the Penghu archipelago more than twenty times for short-term fieldwork since 2016. Furthermore, before commencing this research project, I had already gathered related data on the Five Generals in collaboration with former colleagues from a previous research project, which provided me with a better understanding of Penghu.

Moreover, the networking I established with the inhabitants of Penghu proved advantageous in identifying and approaching potential interviewees during the fieldwork. This networking enabled me to gain greater access to the local community, which was invaluable during data collection. In light of this background, I will now introduce the selected methods employed during the fieldwork to provide a comprehensive account of the data collection process.

To elaborate on the methods used in this research, Rossiter et al's (2010) statement is worth considering. *''It is crucial to note that there is a very strong interplay between these two elements. Research questions suggest epistemological and methodological choices, but the latter also suggest particular ways of viewing the problem (and, indeed, the real world)''*

(Rossiter et al., 2010, p. 3). Therefore, the choice of methods should be aligned with the research questions and the theoretical framework.

3.2.1 Archival research

Historical perspective is crucial for comprehending how culture is established and transformed over time. To this end, archival research effectively uncovers critical historical junctures that have shaped wind resilience. Therefore, I chose archival research as the first method to gain an overview of wind resilience in the temporal dimension.

The decisive historical points that have contributed to enhancing wind resilience through archival research can be identified and examined. Archival research, as Timothy (2012) mentioned, is that data is already there before the research was started (Timothy, 2012). Wideman mentioned*, ''Archival research has been long recognised as a key method in geography, and such research continues to appeal to scholars excavating historical influences on contemporary places''* (Wideman, 2022, p. 395). Therefore, in addition to contemporary data collected through interviews, mapping and participant observation, archival research is utilized in this study to examine the historical aspects of wind resilience on the Penghu Islands. By integrating archival data, this research provides a more comprehensive understanding of the cultural and historical context of resilience on the islands.

Archival research also stands as one of the core methods in academia and has been used for centuries, the starting discipline is history (L'Eplattenier, 2009; Timothy, 2012). Today, this method is broadly used in social sciences. From material documents to digital texts, archival research embraces multiple forms of mediums (Ventresca & Mohr, 2017). That means contemporary documents, government documents, digital databases, or digitalized newspapers are all included. Archival research helps researchers to minimize biases via various types of mediums. Meanwhile, *''archival research itself is not an analytical method but rather a set of approaches to understanding physical data and their meanings''* (Timothy, 2012, p. 403). Besides the advantages mentioned above, the disadvantages also need to be noted. Archival data was not collected for academic purposes, it is usually not systematically collected (Timothy, 2012). In general, archival research involves the collection, analysis, and interpretation of data. It can be particularly useful in cultural and historical studies, where understanding the past is crucial for understanding the present.

Before delving into the data, it is important to consider the functions of archival research. The following statement holds true, the definition of archival research serves as the locating, evaluating, and systematic interpretation and analysis of the archival resource by social scientists (Lewis-Beck et al., 2004). In this research, archival research plays a role in marking the transformative points of wind resilience from different periods. Besides examining wind resilience, which includes the responses from agents, I utilised archival research to identify the trajectory of wind resilience based on existing data.

By examining wind resilience in historical archives, this research identifies the trajectory of wind resilience based on existing data. The trajectory includes the string of recorded wind and the responses to it within different agents. After listing wind records and responses, the research observes and interprets the transformations and adaptations within agents over time.

To collect the archive data, I utilized two primary resources. The first is the library system, including the Penghu Culture Documentation Center, Penghu Library, and National Central Library. These resources provided access to various government documents and public publications that have not yet been digitized. The second resource is online databases, such as Penghu Info and Penghu Book Database, which contain a wealth of thematic knowledge and historical documents. By utilizing these resources, I gathered a comprehensive set of archival data to support my research on the trajectory of wind resilience on Penghu.

To conduct archival research, I reviewed and marked relevant documents related to wind events, wind policies, and the narrative about winds on Penghu. After collecting the wind-related events, I identify the decisive events and attempt to visualize them in the timeline graph. To facilitate the identification and presentation of wind records and their responses within the archival data, I employed an online tool known as TIMEGRAPHS. This tool enabled the creation of a timeline that included wind events such as typhoons and monsoons, wind policies, and disaster management strategies. Each mark on the timeline was accompanied by the original source data and made publicly accessible on a website. By using this approach, I was able to provide a clear and concise visualization of the wind resilience trajectory over time (Y.-Q. Zhan, 2023).

3.2.2 Mapping the traces of wind

Cartography, a branch of geoscience, means the depiction of the physical world on a map. It is a selective process that aims to present a particular viewpoint. In the context of this research, mapping serves to trace the responses of agents on the Penghu archipelago to the wind. Mapping the traces of wind enables the researcher to understand the intentional responses of agents to wind in the form of landscape changes.

The archival research is the method to access wind resilience within the temporal dimension, while the mapping approach is the way to understand the spatial dimension. Choosing to map the traces of wind is a method that focuses on the cultural practices intentionally presented in the landscape by agents.

Elaborating on the choice of Makong main island as the mapping area, it is essential to note that Makong City is considered the central settlement area on the Penghu archipelago, with a rich history of colonisation by different regimes. The city is also extensively documented, making it a suitable location to be in line with the collected data by archival research. Additionally, Makong City offers diverse landscapes, including the centre of Penghu, the outskirts of the centre, and two islands.

The focus of this method is on recording and marking visible objects in public spaces, infrastructure, and community areas that demonstrate intentional adaptations or responses to wind. Private household inner spaces were not included in the mapping process. The objective was to develop an overview of the tactics and strategies (de Certeau & Rendall, 2011, pp. 34–39) used by individuals, communities, and institutions to cope with winds and to examine these within the context of culture and history.

In October 2020, I conducted fieldwork in eight communities. in 7 communities in Makong City and one community in Xiyu to capture the intentional and visible traces of wind. The purpose of mapping the traces of wind was twofold: to understand how individuals, communities, and institutions cope with wind, and to develop an overview of wind-coping adaptations in the cultural context of the Penghu Archipelago.

Visited communities

There are two decisive factors in choosing visited communities. First, the historical significance of the communities was considered due to Penghu being an immigrant society where most inhabitants are descendants of Chinese/Han migrants who arrived on the islands in the 16th century. This was confirmed by archaeological sites found on the islands that indicate the presence of Taiwan's indigenous tribes before the migration (G. Zhan, 2008). To identify the communities that have existed for over 350 years, I overlapped Google Maps with historical settlements from Penghu jilüe (Zhou, 1743), a documentation about Penghu written by the Qing government. Second, the wind speed was considered before selecting the

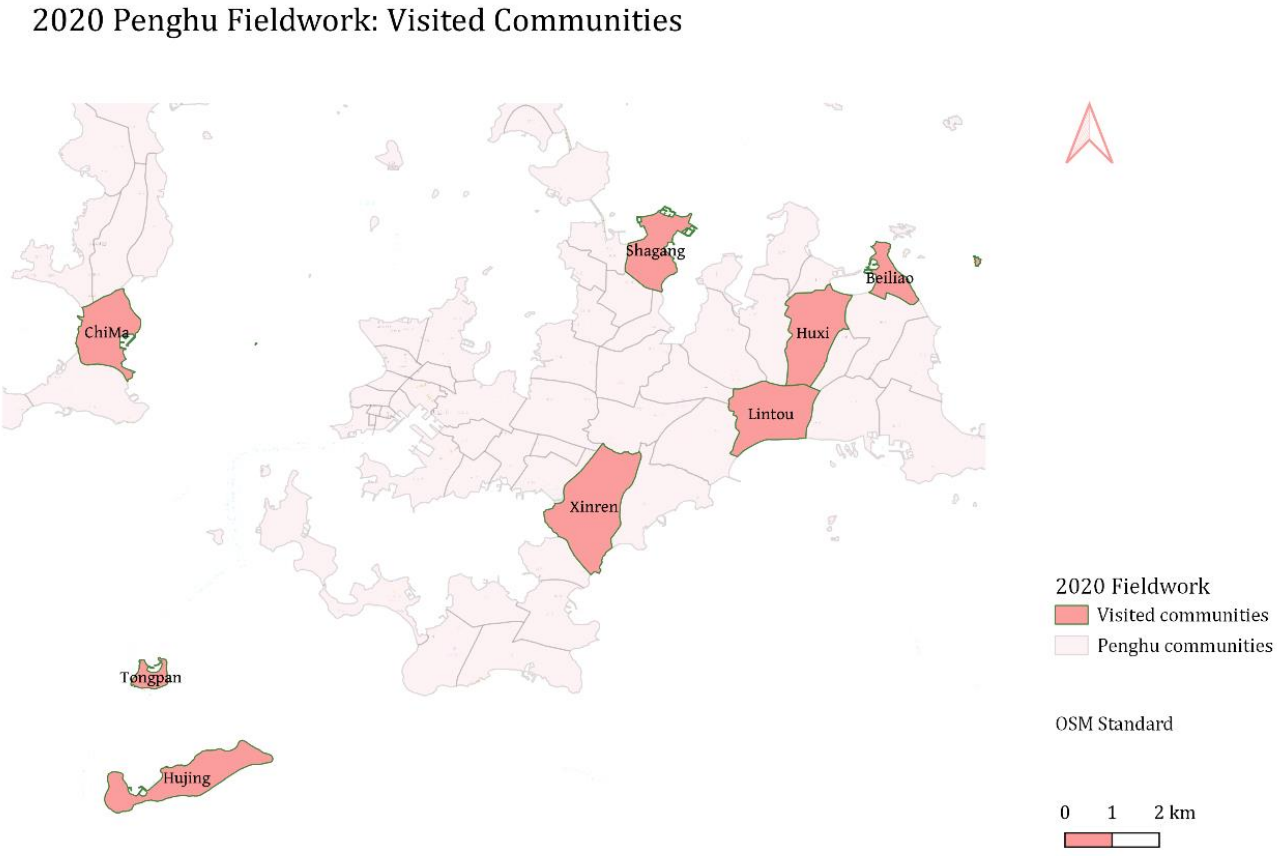


Figure 4 Visited communities in 2020

communities to map. However, not all townships have weather stations to track wind speed. Therefore, recommendations from specialists in the Penghu weather station and a published paper were consulted to identify the communities that face stronger winds in monsoon seasons due to their geographical locations (H.-H. Li et al., 2019).

Therefore, based on historical and geographical considerations, I selected specific communities to map. **Error! Reference source not found.** shows the communities I visited. I chose Beiliao (北寮) and Shagang (沙港), Xingren (興仁) and Lintou (林投) as mapping communities. While mapping the Huxi (湖西) community, I focused on mapping the Caizhai (菜宅, garden) objects rather than the whole area because Huxi owns the huge area of Caizhai landscape. In addition to the communities on the main island of Penghu, I also included two isolated islands in Magong city, Tongpan (桶盤) and Hujing (虎井), **Error! Reference source not found.** marks the mapping area.

Categories of mapping: the responses to the traces of wind

The mapping method for tracing the winds is organized into two categories based on focus: The Agent Perspective and the Function-oriented (Table 2). The Agent Perspective category identifies which agents respond to the winds, and it consists of three items: public, private, and religious. On the other hand, the Function-oriented category focuses on the objects' function and includes three items: reaction to wind, use of wind, and impact from the wind. While distinct differences exist among the items in the Agent Perspective category, the border between the items in the Function-oriented category sometimes overlaps. Thus, the definitions of each item in these categories attempt to clarify the borders as much as possible. This categorization helps the researcher differentiate the agents and functions and better analyse the data collected through the mapping method.

Category1	Agent perspective	Public
		Private
		Religious
Category 2	Function orientated	Reaction to wind
		Use of wind
		Impact from wind

Table 2 Categories of mapping the traces of wind

Category 1: Agent perspective

(1) Public: The government or institution or community established the object in a public space.

(2) Private: A community member sets up an adaptation object in the landscape. It can be for private or household use.
(3) Religious: The adaptation object is connected to the religious system within a community, including talismans and objects within temples.

Category 2: Function orientated

(1) Reaction to wind: An adaptation to respond to winds, focusing on the reactions.
(2) Use of wind: Using wind to get benefit from it.
(3) Impact from wind: Remembering impacts of wind, including the memorial narratives. For example: recording wind disaster events. And damaged items due to wind.

The mapping process on choosing which objects to map is based on whether the object is set up with intension. The only exception is the impact from wind, as it is caused by natural phenomena.

Setting mapping areas within communities: Five Generals

In this study, the research area is delimited by the Five Generals (五營), which is in every community on Penghu. The Five Generals is a visible marker representing the Taoist generals' protective generals (Tseng, 1999). According to local belief, God designates power to his generals, who defend the east, west, south, north, and centre borders of the communities. Islanders believe that the Five Generals protects their communities from evil spirits, wind, and water, and from an emic perspective, this system defines a relatively safe area. Outside this area, one typically finds flat lowlands and coastlines.

The Five Generals has numerous forms, ranging from primitive bamboo sticks to carved columns and concrete shrines. Although the Five Generals is named, there are many variations within the Penghu Archipelago. For instance, in some communities, such as Guoye (菓葉), 13 general shrines were found in the previous fieldwork. I use the border of Five Generals to set the mapping areas in communities. The system is an important cultural marker that underscores the importance of wind resilience to the islanders and provides a tangible means of examining wind resilience within these communities. Figure 5 marks the Five

Generals areas with yellow lines, and the red line is the administrative border of the Lintou community.

Figure 5 Lintou community, Google satellite with the post-production to mark the areas of five generals.

After marking the Five Generals areas in a community, I rode a motorbike and went through every alley within the selected communities. Meanwhile, I marked the place on the printed map and took photos, with GPS data, of the object when I noticed an object related to the response to wind. After data collection, I mapped these objects on Qgis with different colours according to the categories. Then I create a visual representation of the distribution and diversity of wind-related objects in the mapping area. The mapping result helps to analyse the patterns and relationships between the objects and involved agents in terms of wind resilience. The detailed result will be presented in the next chapter.

3.2.3 Expert and community member interview

Having discussed the responses to winds in the historical trajectory of wind resilience, as well as an investigation of wind responses in landscapes, this study now shifts focus to the perceptions and memories of winds held by individuals. The interview method operates as a

complementary approach to include the opinions, narratives and perceptions to wind from individuals. A perspective that may be lacking in the previous methods utilized in this research.

Interviews as an approach are the most common method of qualitative research (Opdenakker, 2006). To investigate perceptions and memories of wind on Penghu, I have chosen the interview as the method, focusing on experts and community members interview. Interviews can be divided into three different types, structured interview, open-end (unstructured), and semi-structured interview (Alshenqeeti, 2014). The decision to employ semi-structured interviews was based on the approach's combination of structured and flexible elements. The interview guideline used in the semi-structured interviews contains research questions prepared by the interviewer. During the interview, the interviewer aims to ensure that all prepared questions are addressed. The use of semi-structured interviews allows the researcher to guide the conversation while allowing the interviewee the freedom to express their ideas and provide more detailed responses.

Following the conducted interviews and considering the distance between the interviewees and the interviewer, it is noteworthy that digital online interviews have gained popularity, especially during the pandemic. However, despite the convenience of online interviews, it is difficult to replicate the interactive conversation that can occur during face-to-face interviews. As a result, in this study, face-to-face interviews were chosen despite a higher cost than digital interviews, as they offer more interactive and nuanced discussions with the interviewees. With face-to-face interviews, the main advantage is the synchronous communication of time and place (Opdenakker, 2006). Due to this characteristic, the interviewer could capture richer social cues (Basch et al., 2021) than other interview forms during the interview.

The selection of interviewees can be classified into different categories, such as focus group interviews, expert interviews, and stakeholder interviews, among others. In this study, both expert and community member interviews were done. These two groups were chosen due to their respective areas of expertise and focus. The expert interviews focused on wind governance and the perception of wind disasters, while the community member interviews focused on the perceptions, memories and narratives of winds. Both groups were based on the Penghu archipelago, and through their narratives, the island-specific culture of winds, including cooperation and conflicts, was observed.

Two field trips were undertaken for the purpose of conducting interviews. The first in 2020 and the second in 2022, with each field trip focusing on a different group. During the first field trip, interviews were conducted with experts and officers at the Penghu government in an attempt to comprehensively understand the governance of wind. The second field trip, on the other hand, was designed to focus on the responses, perceptions, and memories of wind among community members. Separate interview guidelines were prepared for each field trip, based on the respective research goals.

The goals of the interviews include the following aspects and main questions, the interview guidelines can be found in Appendix A:

Experts interview on the first field trip (2020): 7 interviewees

- Having a preliminary understanding of how government units deal with typhoons and monsoons: The work procedure, responsibilities, conflict coordination, news dissemination, decision-making, and government policy.
- How interviewees describe wind (typhoons and monsoons).

To gain a comprehensive understanding of the governance of wind, I visited six government agencies that are responsible for various aspects related to wind, including the Fire Bureau, Magong Weather Station, Agriculture and Fisheries Bureau, Public Transportation Management Office, HuJing Nursing Center, and Penghu Living Museum. In addition to experts from the government, I also conducted two walking interviews with local historians. Furthermore, I visited one quasi-government organization, the Honglou Community Development Association, to gather additional insights and perspectives related to wind governance.

Community members interview on the second field trip (2022): 27 interviewees

During the second field trip, the selection of interviewees was done carefully, taking into consideration the economic structure of Penghu (Penghu Government, 2016), as well as professions that are related to wind. Three main industries were selected for the interviews, namely fishery, tourism, and agriculture. Figure 6 shows the main objectives of the interviews, the objective list was as follows:

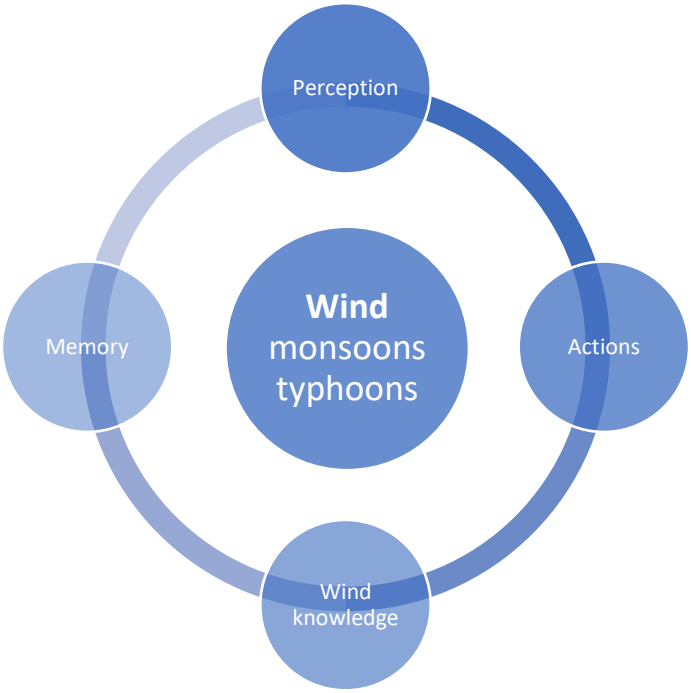


Figure 6 Objectives of community interview on second field trip (2022)

- Understanding islanders' perception and feeling of monsoons, typhoons, and daily wind on Penghu.
- Understanding the change of perception of winds over time.
- Understanding the source of knowledge about winds on Penghu
- Understanding the responsibility/mutual trust issue/cooperation of individuals and the government regarding wind management.
- Investigating local memories of winds.

Each interview conducted during the fieldwork lasted between 45 minutes to an hour. Before starting the interview, I requested permission from the interviewee to record our conversation. The majority of the interviews were conducted individually, there were 23

individual interviews in total. Besides individual interviews, there are 3 that were conducted as group interviews based on the best-suited situation at the time, as per the willingness of the interviewee's partner.

In the analysis of data collected during the first field trip, an inductive approach was employed to gather a comprehensive understanding of the information provided by interviewees and to identify gaps in wind policies across different regimes. Standardized questions were asked in every interview, and interviewees were not provided with the questions beforehand. To facilitate the analysis, the entire contents of the audio recordings were transcribed. The inductive approach involved assigning codes to each sentence through MaxQDA to create categories.

In contrast, a deductive approach was utilized for the analysis of data gathered during the second field trip, which focused on community member interviews. This time, transcription was supported by project funding and I had a clearer understanding of the objectives. Four main themes were established to guide the interviews: 1) Perception & feeling of winds, 2) Actions to winds on Penghu, 3) Winds knowledge, 4) Memory of winds. Instead of assigning codes to each sentence, a paragraph analysis method was employed. Each paragraph was given a topic based on the four themes, and categories were assigned to each paragraph accordingly.

3.2.4 Participant observation

In addition to the three methods mentioned earlier, participant observation was also utilized during the fieldwork to facilitate an integrated narrative. *''According to Marshall and Rossman (1989), the definition of observation is the systematic description of events, behaviours, and artefacts in the social setting chosen for study''* (Kawulich, 2005, p. 2). Participant observation as a widespread qualitative approach used in different disciplines, especially since it is a staple method in anthropology (Musante & DeWalt, 2010). There are three advantages of participant observations: (1) it allows access to backstage culture, (2) it allows for a thick description of a society or group, (3) and provides opportunities and a means to report on unscheduled sorts behaviours and events (Bernard et al., 1998, p. 43). This research focuses

on the cultural perspective on wind. Therefore, participating in cultural activities related to wind response is necessary.

However, the limitations of this method need to be noted: (1) Suitability of the research topic. For example, surveys may be more efficient for the topic of crime rate, and (2) simply relying on one or two key informants can be problematic since these informants have to be competent within the society (Bernard et al., 1998, p. 45). Hence, participation in ritual events or social activities was based on the research questions and their connections to responses to wind. About key informants, I collected information from different agents based on their roles in institutions or at community levels. This approach guarantees multifaceted perspectives. The following paragraph contains the activities I participated in and the explanation of why I selected them.

In my two field trips, I joined various activities on the Penghu archipelago. Based on the findings of mapping and interviews, I selected the events associated with winds during fieldwork, such as the 2020 Angnata intertidal zone festival at Honglou, beach cleaning day at Longmen, the Five Generals pilgrimage at Fenghui, and going fishing with fishermen. The reason for choosing participant observation as a method is to access firsthand data from present-happening activities. Through participation observation, I directly engage with people and build connections with them to facilitate further contact. For example, after participating in a beach cleaning day, I arranged interviews with participants.

Table 3 shows the reasons for participating.

Activity	**Why the activities related to wind**	**Community**
2020 Angnata intertidal zone festival	Stone Weir has more harvest in Monsoon season, how it works.	Honglou
Five Generals' pilgrimage	Mark the spiritually safer area in a community.	Fenghui
Beach cleaning day	Monsoon brings the garbage.	Longmen
Going fishing with fishermen	Checking wind level before going fishing and wind knowledge.	Honglou

Table 3 Attending activities during the field trip

In addition to the targeted activities related to responses to wind, I also joined other activities that the interviewees conducted during the interview, for example, helping noodle makers to dry the noodles and joining farmers in the garden work. I collected data through participant observation by taking notes and, with permission, recording conversations with individuals. This method complements the findings on the cultural responses to wind resilience on the Penghu archipelago. This included activities such as drying noodles outside in the factory yard or asking outdoor basketball players about how they deal with sudden wind gusts during a game. These incidental activities provided valuable opportunities to gain further insights into the interviewees' experiences and perceptions of wind in their daily lives. Further details about these activities will be provided in the empirical chapter.

3.3 Challenges and the limitations

This research project faces two main challenges and one limitation, which require careful consideration. The first challenge is related to the COVID-19 pandemic, which covers almost two-thirds of the research project period. From the research design to the limitations on travel for fieldwork, the pandemic has significantly impacted the scope of this research. Due to travel restrictions and visa issues to Germany in 2020, I began the research with the first fieldwork after completing a part of the literature review on resilience research. As I previously mentioned, selecting appropriate research methods involved a back-and-forth process. Consequently, the research methods were chosen during the course of the research. Additionally, the pandemic has affected the strict quarantine rules in Taiwan. During my second fieldwork in 2022, I was required to quarantine for two weeks in a designated hotel. Furthermore, both field trips were conducted during the pandemic, which caused some planned interviewees to be hesitant about meeting in person or participating in interviews while wearing masks. Building trust among participants took more time than in previous years.

The second challenge of this research project is related to the main subject, wind, which is challenging to capture, as it is intangible and elusive. Only when other objects reflect on it through the material world or people's perceptions can wind be discerned. Nonetheless,

this challenge is also the most appealing aspect of this research. Despite being an intangible and elusive natural phenomenon, the characteristics of wind reflect the ubiquity of lifestyle adjustments on the Penghu archipelago.

In addition to the two challenges, there is one significant limitation, which is related to the short duration of typhoons. Due to the limitations imposed by the COVID-19 pandemic, it was challenging to trace the short-term impacts and responses of community members to typhoons. The two fieldwork periods did not coincide with any typhoon occurrences. To compensate for this limitation, I conducted expert interviews, community member interviews, examined archives, and reviewed media reports to gain insights into the impacts and responses.

3.3.1 Reflection

Reflecting on my initial research project on Penghu in 2016, as described in the preface, I realized that it was a season with calm waves and without strong monsoons. In the absence of wind to provide relief from the scorching sun, I began to feel dizzy while working in the exposed heat. During that time, I engaged in various research activities, such as taking photographs and cleaning tombstones - without fully comprehending the research process. Nevertheless, I enjoyed interacting with the locals and gaining insights into their perspectives and also ensured that the fieldwork covered the areas the former research teams had intended to investigate. My primary task was to collect data and deliver it into the database. While I did not consider my positionality in research at the time and did not fully comprehend the research's significance or how to approach the data in my previous project, I came to realize the importance of these considerations as I continued to conduct research in the field.

When this research was supported by the research team in the CUORE project, I commenced planning the fieldwork, considering the research design, methodology, my positionality, and the sequence of applied methods. My role had transitioned from merely executing tasks to creating them. This change in role afforded me greater flexibility, but it also entailed more responsibility.

In order to comprehend the cultural perspective on wind resilience on the Penghu archipelago, four distinct methods were employed in this research. The approach taken involved tracing wind resilience through spatial, temporal, and perceptual aspects. The mixed-method approach provides a comprehensive way to understand the impact and

response to wind by agents. Through the analysis process, these results can reveal the application of the culturally oriented concept of resilience.

Chapter 4: Cultural Importance on Wind Resilience: The Penghu Archipelago as A Case Study

''Wind is not a problem to us'' is the standard answer of the people of Penghu. But how can wind not be a problem? During my days in the fields here, a sudden gust of wind blew in, and I couldn't even hold onto the handlebars of my motorbike. While standing on the shore to record, a gust of sand blew in, and suddenly, I couldn't open my eyes. Maybe because I'm not from Penghu, I'm not used to it.

Looking around Penghu Island, you can see traces of the wind everywhere, in the landscape and in the mindset. The wind is carved into the terrain of Penghu and also into the spirit of its people. One day, after an interview, I was invited to have lunch with the noodle shop's owner, as Penghu people are so hospitable. I asked about the influence of the wind on them, and they said the wind was not a problem. They're used to it. However, the strength of the wind every day will affect the proportion of noodles made. Without wind, the noodles won't dry easily, and the direction of the wind is also a variable. I asked the owner how to combine these variables, and he said it's based on experience. There's no formula. The owner said that the noodles dried by the northeast monsoon have a natural salty flavour, which is the taste of Penghu's sea.

I've always wondered why wind is not a problem for Penghu, or maybe I asked the wrong question. Wind is a problem, but it has not been problematized, at least not in this generation. If the timeline is extended, the wind will surely be a problem that needs to be overcome. As I delved into the archives, I unearthed a fascinating account of how the Japanese colonists crafted their policies around the mighty wind. My explorations of the landscape led me to discover two stunning sights - Shigandang, shielded from the strong wind, and the grey Caizhai, a unique landscape that can only be found in Penghu. As the fishing boats returned to the harbours, I strolled through the bustling fish market, listening intently as the fishermen regaled me with tales of their unyielding struggles against the ferocious wind. Wind and Penghu are inseparable, their destinies entwined in a never-ending dance. Indeed, the moniker "Wind Islands" is not in vain, for the culture and wind resilience of the people are born from their relationship with the wind. The spirit and identity of the Penghu people are also strong and eternal in the wind.

From my notes of the Penghu field trip

This chapter will demonstrate the cultural perspective in wind resilience through empirical observations and insights. To validate scientific conclusions, reliance on empirical evidence is crucial (Wenning & Vieyra, 2020). This chapter commences by justifying the selection of the Penghu archipelago as a case study. The introductory description of the Penghu archipelago, informed by geographical and historical perspectives, lays the groundwork for understanding the Penghu culture. After explaining two dominant wind phenomena in Penghu, the narrative shifts towards examining the cultural perspective of wind resilience through the following methods.

First, drawing from collected data and employing archival analysis, the trajectory of wind resilience offers insights into governmental strategies for wind-related challenges. Examining winds encompassing natural, cultural, and socio-political lenses expands the discourse on cultural perspective on wind resilience.

Second, the following chapter delves into the outcomes of mapping wind traces, visually illustrating the adaptations to wind on the landscape. This landscape-centric analysis unveils the complex interplay between human activity and the natural environment. Mapping the adaptations to wind traces enables us to gain tangible insight into responses and innovative reactions embedded within agents' behavioural patterns across the landscape. This perspective further firms the understanding of wind resilience's cultural facets.

The third section of this chapter centres on the perception of winds within island communities. Here, I elucidate the Penghu people's perceptions of winds and highlight the conflicts between government policies and community coping strategies. These contrasting viewpoints contribute to the detailed interactions of wind resilience dynamics.

4.1 The Penghu Archipelago, Taiwan

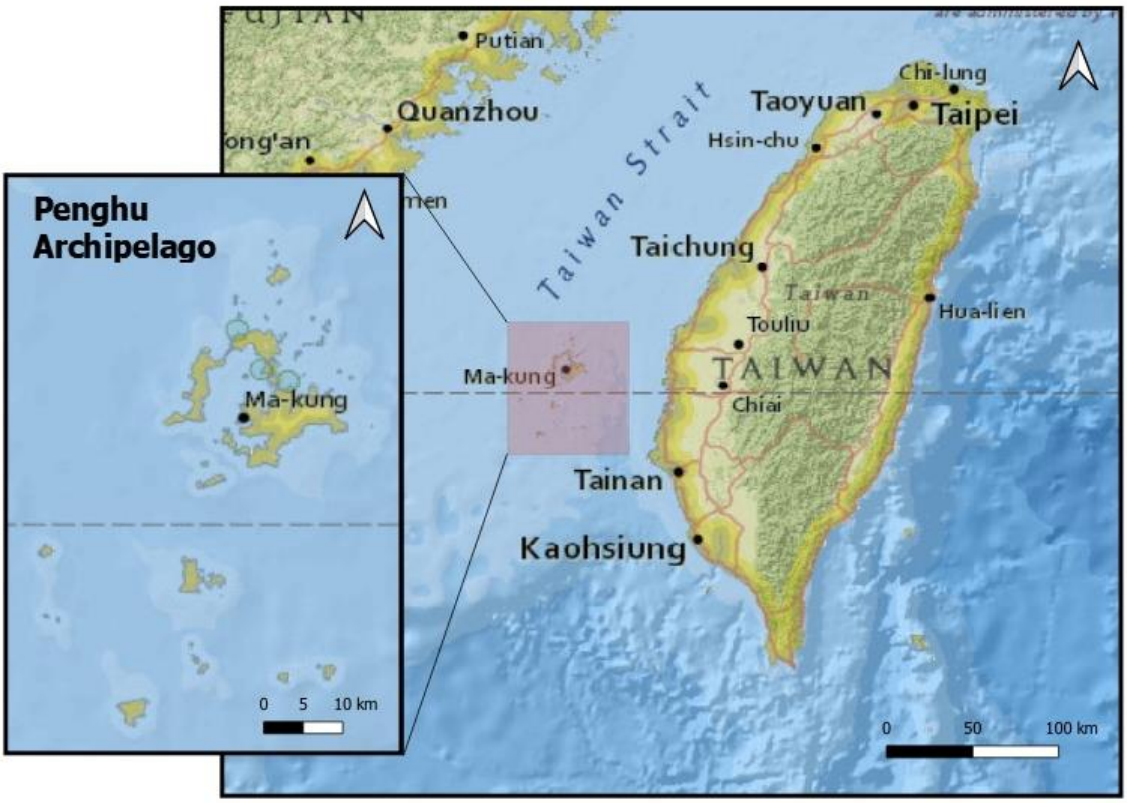


Figure 7 Left is the Penghu archipelago; the right map is Taiwan's main island. Copyright: ArcGIS Online map hosted by Esri, edited by author.

The Penghu archipelago, positioned in the Taiwan Strait approximately 50km to the west of Taiwan's main island, encompasses around 90 islands. See Figure 7. Among them, 20 islands are consistently inhabited, home to approximately 100,000 residents. Notably, the largest islands within the Penghu group include Magong, Xiyu, Baisha, Wangan, and Qimei. In terms of land area, the entire archipelago spans 141.1 km².

Earning the nickname of the ''Wind Islands'', the Penghu Archipelago's name highlights the crucial role of wind in shaping both the physical characteristics of the islands and the daily experiences of its inhabitants. This terminology indicates the deep-seated connection between wind and the archipelago's geographical features and its profound impact on the lives of the local population.

The central focus of this research will be the Penghu archipelago, chosen for its suitability as a case study due to its specific characteristics. Three compelling reasons stress this selection: firstly, the archipelago's exposure to winds as primary stressors from typhoons and disturbances caused by monsoons; secondly, the consequential impact of wind conditions on its economy, society, and lifestyle; and finally, the prevalence of wind-related concerns among individuals, communities, and institutions. The details will be explained in the following section.

4.1.1 Winds on Penghu: Typhoons and Monsoon

Wind, in its essence, is a dynamic flow of air (DevelopmentProject-NationalEnergyEducation, 2021). Yet, its interpretation varies across meteorological classifications, contingent upon the scale of this atmospheric movement (Makarieva et al., 2013). On the Penghu archipelago, for instance, the two significant wind phenomena are typhoons and monsoons (National Science & Technology Center for Disaster, 2014). The climatic conditions of typhoons and monsoons play a pivotal role in shaping the social-natural interactions on the Penghu archipelago (Y. Liu, 2022; Penghu Government, 2005). These two distinct wind phenomena, each characterised by unique features, impact the islands in different seasons. Generally, Penghu experiences tropical typhoons during the summer season and monsoons in the winter season.

Typhoon

Typhoons are severe tropical cyclones. According to the Central Weather Bureau of Taiwan, when a low-pressure system originates over the tropical waters of the northwestern Pacific Ocean and its maximum average wind speed intensifies to 17.2 m/s or more, it is classified as a typhoon. The term ''typhoon'' is thought to have evolved from either the Cantonese phrase ''大風 (daai fung)'' or the Hokkien expression "風篩 (hong-sai)''. In present-day Hokkien, a typhoon continues to be called "風颱 (hong-thai)'' (Junjie, 2009).

The core of the cyclone, known as the eye, comprises a low-pressure centre accompanied by strong counter-clockwise winds in the Northern Hemisphere. The Central Weather Bureau of Taiwan uses the wind speed near the cyclone's centre to categorise its intensity, ranging from typhoon (17.2-32.6 m/s) to medium typhoon (32.7-50.9 m/s) and

strong typhoon (<51 m/s) (CentralWeatherBureau, 2023; Penghu Government, 1960). Typhoons draw their strength from sea surface temperatures surpassing 27°C, mostly during summer. When a typhoon is approaching usually carries a significant amount of rainfall (Terry, 2007).

According to statistical records of typhoon occurrences in Taiwan spanning the years from 1897 to 2014, there are nine potential routes that typhoons may follow as they pass the region (National Science & Technology Center for Disaster, 2014), see Figure 8. On average, Taiwan experiences approximately 3.6 typhoons annually (T. Liu, 2019), and only two of these routes directly impact Penghu, which are Route G and Route I. This indicates a relatively low

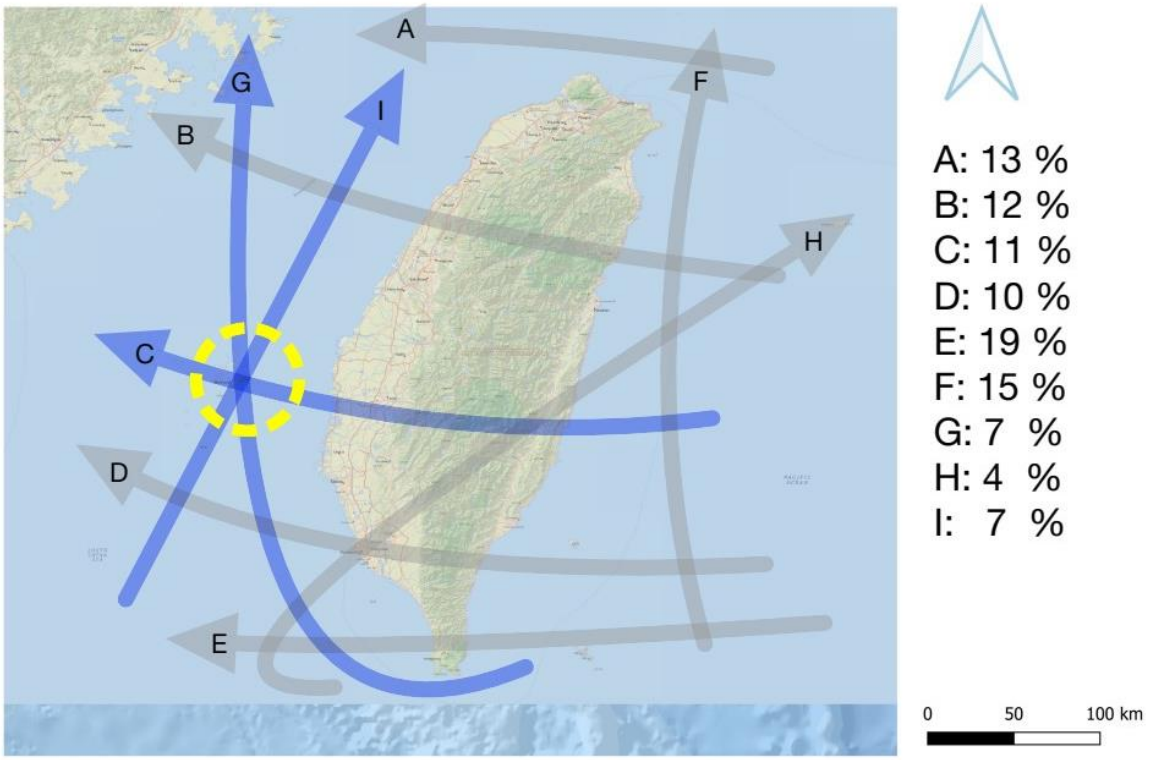


Figure 8 Typhoon routes (Source from Central Weather Bureau, 2014), reproduced by author

percentage of direct typhoon encounters in the archipelago. When a typhoon passes over Taiwan's main island before reaching Penghu, like Route C, the typhoon's intensity weakens. Consequently, Penghu is relatively safer under such circumstances. However, if a typhoon makes landfall on Penghu first, the archipelago becomes the forefront facing the full force of the typhoon's strength.

The challenge posed by typhoons revolves around their short notice. Weather bureaus are able to identify low-pressure systems only a few days in advance, plus the dynamic nature of their routes often results in sudden shifts, rendering predictions about precise landfalls inherently difficult. A notable example of a devastating typhoon on Penghu is Typhoon Wayne (1986), renowned for its severe impacts. According to historical records from the Penghu government, Typhoon Wayne registered a maximum gust of 68 m/s, a peak average wind speed of 29.8 m/s, and a cumulative rainfall of 227 mm (National Science & Technology Center for Disaster, 2014). It caused more than a hundred fishing boats to sink or break in harbors, crop damage and transportation disruption in Penghu and the outlying islands. Based on the historical records of typhoon routes affecting Taiwan from 1911 to 2021, only 13.5% of typhoons directly passed through Penghu (CentralWeatherBureau, 2023, p. 22; Shieh et al., 1998), with the majority of them first making landfall on the Taiwan main island.

Regarding the trend of typhoons, it is anticipated that the frequency of typhoons will undergo a decline, overlapping with the overarching impacts of climate change (CentralWeatherBureau, 2023). This shift, however, is accompanied by a remarkable projection: the intensity of these typhoons is projected to intensify (Anthes et al., 2006; Denglong, 2021; Emanuel, 2005).

Monsoon

Monsoons are often understood as *"the moist summer circulations that provide most of the annual rainfall to many countries in the tropics and subtropics, influencing over one-third of the world's population"* (Geen et al., 2020, p. 1). This circulation, similar to a large-scale land-sea wind system, results mainly from differential heat capacities of land and oceans, changing sun positions throughout the year, and the Coriolis Effect due to Earth's rotation. The ocean's higher heat capacity leads to gradual temperature changes, while land, with a lower heat capacity, experiences more pronounced variations. The divergent rates of solar radiation absorption and nighttime radiative cooling between land and oceans bring about seasonal circulation changes (Central weather beareau, 2023).

Taiwan is located within the reach of East Asian and Northwestern Pacific monsoon systems, causing its climate prone to monsoon influences. The Penghu archipelago experiences the influence of two monsoon patterns throughout the year. The first originates from the South and Southeast Asian region, blowing from the southwest between May and September. Monsoons are associated with the interchange of air masses between the Southern and Northern Hemispheres, giving rise to its notable attribute of broad geographical scope. Additionally, it possesses the distinct characteristic of being a prolific source of abundant rainfall (Wu 1998). However, this is not the case on the Penghu archipelago. While the literature has often emphasized the destructive impact of the wet summer monsoon, this research provides insights into the dry winter monsoon.

The winter monsoon direction originates in the northeast, stemming from Mongolia, and prevails between October and April. This phenomenon is called the northeast monsoon (東北季風) in Taiwanese terminology and marks a significant meteorological distinction. While typhoons affect the Penghu area briefly, the northeast monsoon has a climatic influence. Notably, the winter monsoon experienced in Penghu differs from that of South Asia, which garners more recognition in academic literature and media. Unlike the monsoons experienced in South Asia, the winter monsoons in Penghu do not bring significant rainfall due to the island's terrain. Interestingly, the summer monsoons are weaker in comparison to the winter monsoons in Penghu.

This study focuses on the northeast winter monsoon. Figure 9 illustrates the prevailing wind directions during the winter monsoon seasons in Penghu. The wind direction data used in this figure was sourced from the Dongji weather station and covers the period from 1963 to 2022. The primary wind directions observed during this period predominantly originate from north to northeast.

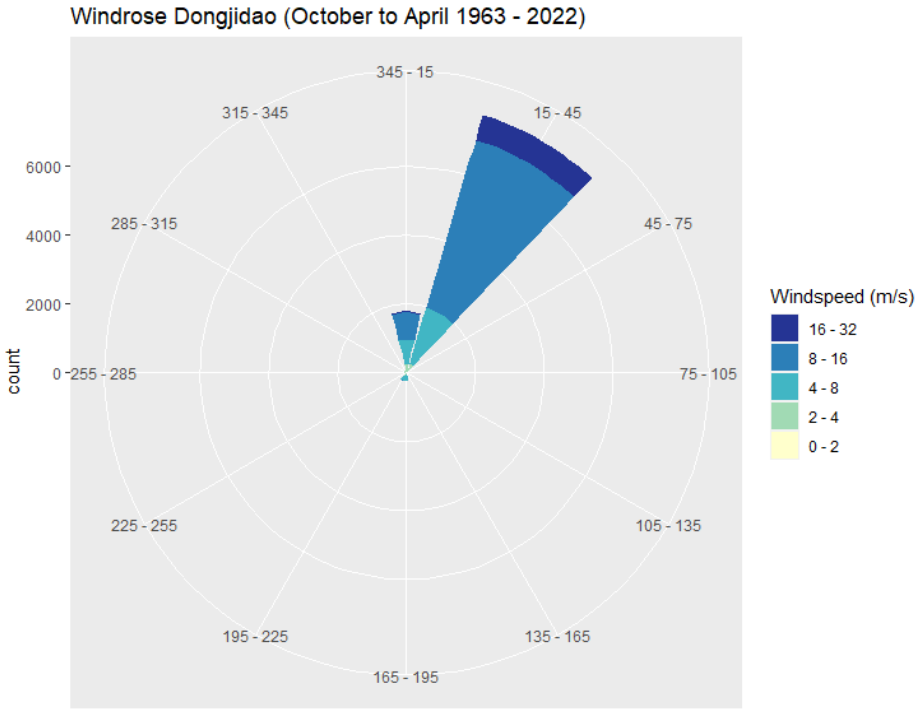


Figure 9 Windrose of Dongji weather station. This windrose figure was processed by Matti Benne (Forschendes Lernen in CUORE project)

Despite the annual average wind speed on Penghu measuring 6.3 m/s, wind speeds during the winter northeast monsoon occasionally escalate to the threshold of a moderate typhoon (32.7-50.9 m/s). Effectively, Penghu remains within the sphere of the winter monsoon season for nearly half a year, necessitating biota to adapt to these external stresses for survival. The archipelago's flat topography leaves it vulnerable to the force of passing monsoons and typhoons, as the absence of protective barriers intensifies wind gusts. The islands, predominantly of volcanic origin (excluding Huayu islet), coupled with susceptibility to wind erosion, result in thin soil surfaces. While annual evaporation on Penghu is approximately 1600mm, annual rainfall stands at 1000mm (Penghu Governement, 2021). Within these challenging environmental conditions marked by wind exposure and water scarcity, agriculture and afforestation pose significant hurdles on Penghu. Regarding the tendency of monsoons on Penghu, the wind speed has declined in the last half-century (M. Xu et al., 2006), but it still has a big impact on the Penghu archipelago.

In addition to the ecological considerations, the inhabitants of Penghu synchronise their lifestyles and occupations with distinct wind conditions. These two types of wind, typhoons, and monsoons, impact contemporary society and wield pivotal historical influence by shaping temporal dynamics such as governance and cultural interactions. This facet will be further elaborated in the segment delving into the trajectory of wind resilience.

4.1.2 From a demographical and historical perspective

From a demographical and historical perspective, Penghu's built landscape and expertise in environmental interaction have been shaped by several waves of migration. First, Penghu was inhabited by Taiwan's indigenous tribes, as indicated by archaeological sites found on the islands (Tsang, 2006). Since 1281, Penghu has been included in the territory of the Yuan Dynasty. Most people today are descendants of Qing immigrants from the 16th century. Nevertheless, numerous international interventions have influenced Penghu's history, demography, and politics in recent centuries. The Dutch, for instance, constructed a fortress and trade post on Penghu (1622-1624). Some foreign influences endure, as the islands are still referred to as the Pescadores (fishermen's Islands), a name given by the Portuguese in the 16th century. Despite their Portuguese name, fisheries have never been the primary source of income from an economic perspective.

The Japanese occupied Penghu from 1895 to 1945. Before and during the Japanese period, agriculture was the main source of food. In the 1930s, 70% of Penghu's population worked in agriculture. Subsistence farming was quite common as people had home gardens. According to the most recent census in Penghu 2015, the number of households still active in farming dropped to 15,8% of 38,612 (Penghu Government, 2016), while tourism has become the main economic pillar on Penghu (Wu & Tsai, 2014).

In addition to the main migration from China, Penghu culture and economy have been greatly shaped by internal migration, in particular to the main island of Taiwan in the Monsoon seasons according to Hsueh-chi (Hsueh-chi, 2019) at least since the Japanese period. For example, people on the main island of Taiwan move to Penghu for business reasons when the monsoon season leaves. In other words, without monsoons, the tourism season starts.

Conversely, Penghu residents migrate to Taiwan's main island to seek alternative employment opportunities, evading the inclement monsoon. Consequently, many smaller islands exhibit marked fluctuations in population, with fewer inhabitants during winter compared to the bustling summer months.

In summation, the fusion of migration waves and historical events has sculpted Penghu's demographic landscape and cultural trajectory. A complex interplay of indigenous beginnings, foreign influences, and internal migration dynamics has contributed to the distinctive sociocultural dimensions that define Penghu's past and present.

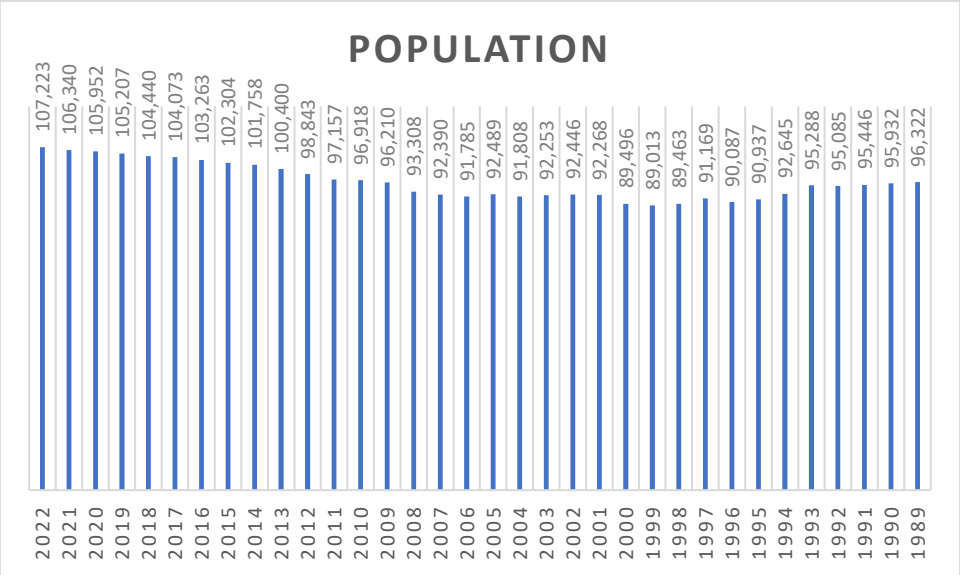


Table 4 Demographics of Penghu, statistical data sourced from the Penghu government. Edited by the author.

Table 4 the population of Penghu has shown a consistent upward trend over the past three decades. Starting from 89,496 in the year 2000, it steadily increased to 107,223 by 2022. The growth has been gradual but consistent, reflecting a positive demographic trend.

4.1.3 The terminology of wind

Multiple definitions of "wind" for general use in Taiwan

Terminology often derives its value from cultural expressions and the specific ways in which different groups or fields use terms to describe knowledge. An understanding of terminology can provide insights into the cultural context from which it emerges. In this section, I will first outline the various definitions of wind generally used in Taiwan. Following this, the specific

terms of wind that were provided by the informants and are employed within the context of Penghu will be introduced.

Table 5 Multiple definitions of wind for general use in Taiwan (MinistryofEducation, 2021). Translated by author

definitions of the word associated to wind	**Description**	**Example Chinese**	**Pronounce**
Natural Phenomenon	In one domain, "wind" pertains to the meteorological phenomenon driven by air movement, including phenomena such as the "spring breeze," "northern wind," and "typhoon." This research primarily focuses on the natural aspect of wind.	風	hong
Landscape and Scenery	In another context, "wind" is employed to describe landscapes, scenes, and scenery, suggesting its role in shaping the visual dimensions of the environment.	風景	hong-kíng
Custom	"Wind" also has connotations related to cultural habits, customs, and ethos. It signifies the influence of wind on behavioural patterns and the preservation of cultural traditions.	風俗	hong-si̍ok
Information and Communication	Wind can also refer to information dissemination, "wind" is used to indicate the spread of knowledge and news, such as "whispers" and "word of mouth".	風聲	hong-siann
Rumor and Hearsay	The term extends to describe rumours or gossip, illustrating how information, whether accurate or not, can spread within societies.	風評	hong-phîng
Manner	"Wind" encompasses social behaviour and manners, including style and interpersonal conduct.	風度	hong-tōo
Disease	Traditional Asian medicine utilises the concept of "wind" to describe specific diseases, such as "rheumatism" and "wind-cold," reflecting the belief that wind can be a vector for illness.	中邪	hong-siâ
Reputation	"Wind" relates to reputation and the maintenance of family traditions, telling the need for family members to uphold particular values and behaviours.	家風	ka-hong

In the context of Taiwan, the term "wind" sometimes extends beyond its natural meteorological meaning and takes on several cultural connotations and associations. There are multiple meanings according to the dictionary published by the Ministry of Education in Taiwan (MinistryofEducation, 2021), the following will illustrate the terminology of wind. Observing the diverse range of meanings attributed to the term "wind" within Taiwanese

culture is intriguing. This linguistic versatility highlights the importance of contextual interpretation when examining this word and its cultural significance. The term "wind" in

Table 6 Words of wind used on Penghu island, collected and translated by author

Chinese	Pronounce	Literal Meaning	Function	Meaning	Types of Wind
憨風	gōng-hong	憨: stupid 風: wind	Perception	Wind on Penghu is not smart. When it comes. It is stupid that does not know it should leave.	Winter Monsoon
鹽水煙	kiâm-tsuí ian	鹹: salty 水: water 煙: mist	Sense, taste	The strong monsoon blows the waves and brings a mist of salty sea in the air.	Winter Monsoon
風彈	hong-tân	風: wind 響: play (music)	Sense, hearing	The wind is so loud that it is like playing music, describing the wind as very strong.	Winter Monsoon
風頭	hong-thâu	風: wind 頭: head	Describe the wind, in detail	Describe the first place of the windward side, which means the strong wind.	General wind
風尾	hong-bué	風: wind 尾: tail	Describe the wind, in detail	Describe the last place of the windward side, which means the place faces the end wind.	General wind
南風天	lâm-hong thinn	南: south 風: wind 天: day	Describe the wind direction	The days blow with the south wind.	Summer monsoon
起風	khí-hong	起: rise 風: wind	Describe the wind, in detail	The wind starts to blow.	Winter Monsoon
風肖	hong-siàu	風: wind 肖: crazy	Perception	Crazy wind, means so strong and in different directions.	Winter Monsoon
倒剪風	thò̍h-ka-hong	倒: reverse 剪: cut 風: wind	Describe the wind, in detail	Describe the wind encountering a wall and then rebounding back. Farmers know some areas cannot plan crops although it is close to the garden wall.	General wind
透風	thàu-hong	透: till the end 風: wind	Describe the wind, in detail	Describe strong wind, verb.	Winter Monsoon
風透	hong-thàu	風: wind 透: till the end	Describe the wind, in detail	Describe strong wind, adverb.	Winter Monsoon
風打魚	hong tá hû	風: wind 打: hit 魚: fish	Phenomenon	The frozen fishes were washed up to beaches by tides after the cold current.	Winter Monsoon
清明風	tshinn-miâ hong	清明: sweeping tomb 風: wind	Describe the wind on a specific day	Describe the wind on sweeping tomb days.	Specific day wind

Table 6 shows the multifaceted nature of the term "wind" in Taiwanese culture highlighting its significance as a symbol and metaphor. Wind in the cultural context is more

than a meteorological description. This linguistic versatility reveals a relationship between language and culture. With this understanding of the terminology of wind as background, I can shed light on the findings of this research.

Terms of wind used on the Penghu archipelago

Having gained insights into the multiple definitions of wind for general use in Taiwan, the focus will now shift to a more specific analysis within the context of Penghu. Data is collected during fieldwork. All the terms are listed in **Error! Reference source not found.** were coded from the interviews conducted.

Comparing the general terminology of wind on Taiwan and the specific usage of wind terms on Penghu, one specific finding is that Penghu has a fine description of wind. Observing the collected words on Penghu, there are two interesting phenomena. First is the personification of wind. For example, stupid wind (憨風) and crazy wind (風肖). The wind here refers to winter monsoons. Personification is not included in the general wind terms used in Taiwan. Penghu people describe winter monsoons with negative images. However, when people explain the meaning of the words, people mention it is part of Penghu, and show an attitude of acceptance. Another phenomenon is there are many details of monsoons. Including the direction, situation and the special senses of monsoon. For example, the salty mist (鹽水煙) brought by monsoons. When the monsoon brings the salty mist to Penghu, it is not only uncomfortable for people, especially for eyes, but also destroys the crops.

4.2 Trajectory of wind resilience with written archive result

In this research, the concept of "trajectory" differs from its typical definition as a path or line of development (Merriam-Webster, 2023). Here, it represents a comprehensive examination of specific spatial and temporal occurrences, policies, and responses related to the winds in Penghu, achieved through an archival research methodology.

The trajectory of resilience is a well-established approach in psychological research, particularly in studies focusing on individuals confronting traumas (Bonanno & Diminich, 2013; Galatzer-Levy et al., 2018; Mancini & Bonanno, 2009). Another branch of the trajectory of

resilience pertains to community preparations, impacts, and responses to natural stressors. However, existing literature within this branch primarily concentrates on individual events rather than tracing a continuum of stressors and events embedded within a historical context (Saja et al., 2019b).

Two crucial points earn emphasis before delving into the findings regarding the trajectory of wind resilience in Penghu. First, it is essential to recognise that responses and adaptations to stressors do not materialise out of thin air. These reactions, encompassing responses and adaptations by the local populace, represent a collective consensus deeply rooted in historical, geographical, and socio-political factors. As elucidated by Ratter in the context of complexity theory*, ''the identity of the system can change over time. Therefore, knowledge about the system's history is fundamental to understanding its present character ''(Ratter, 2012:88).* History, the nexus between the natural environment and human responses, is the key to determining pivotal turning points in resilience.

The second pivotal point involves clarifying the historical perspective adopted in this research. History does not unfold as a seamless, linear trajectory. While the visual representation in the trajectory of wind resilience may convey a constant historical timeline, it is essential to acknowledge that history, from a postmodern perspective (Foucault & Nazzaro, 1972), is characterized by discontinuity. History, as a system, is replete with emergent phenomena and ruptures. Hence, readers should bear in mind that, in essence, the trajectory is a discontinuous representation. The consistent timeline serves as a visual simplification for presenting salient resilience junctures.

Practically, in identifying the decisive factors of resilience, I have marked nodes representing critical events that either shaped or altered the components of wind resilience. The selected criteria include the earliest responses or adaptations to wind found in the archives, the ramifications of severe events or disasters, wind-related governmental policies, and responses to wind at the community level.

In Figure 10 below, the wind resilience trajectory on Penghu is illustrated. In this representation, the records of severe typhoon cases are depicted in green, topics related to monsoons are highlighted in black, and government policies are represented in blue.

Subsequent paragraphs will provide an in-depth interpretation of this wind resilience trajectory. The complete timeline of wind trajectory can be found in Appendix D.

4.2.1 Start points of wind resilience

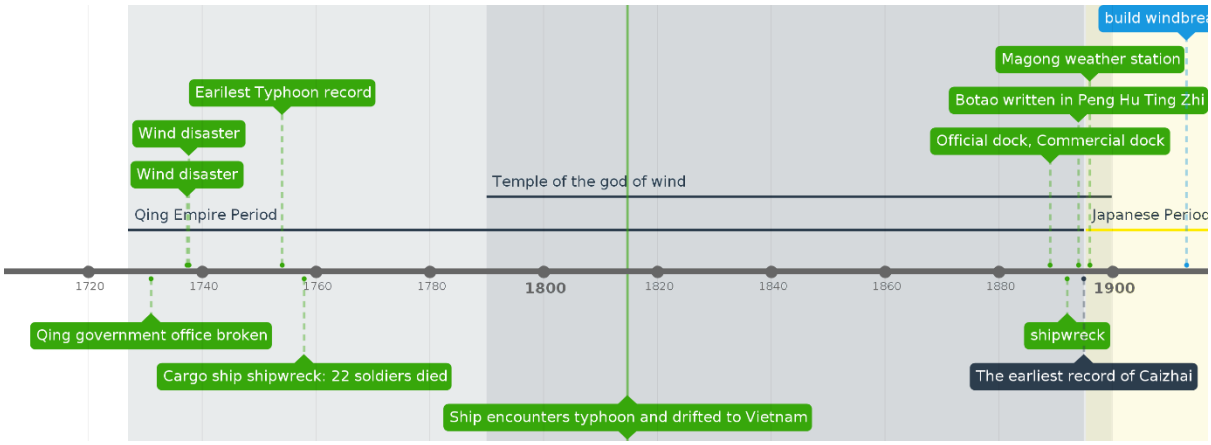


Figure 10 Highlights the trajectory of wind disaster resilience in Qing dynasty

(1) Penghu under Qing dynasty (1683- 1985)

Upon conducting an archival analysis, the initiation point of the wind resilience trajectory can be traced back to 1730, which marks the earliest recorded instance in the archive related to wind (Z. Chen, 1955, p. 74), see

Figure 10. The governmental report of the time documented the structural damage to government offices caused by heavy rain and strong winds. Throughout the Qing Dynasty, most records primarily centred on the impacts of wind.

Religious perspective: The temple of the wind god is removed

From a religious perspective, the commencement of wind resilience efforts can be pinpointed to the year 1790 (Y. Xu, 2023). This significant year saw the construction of the Temple of the Wind God in Magong, It's important to note that across East Asian mythology, the Wind God is known by various names in different cultures, including China, Japan, and Korea.

However, they all share the common attribute of being wind-controlling deities. In Chinese culture, the Wind God is often depicted as a dragon-like figure with a deer's head and a snake's tail. It is sometimes referred to as Feng-bo and has been personified as a Taoist deity,

often depicted as an old man carrying a sack or a fan (Roberts, 2004, p. 39). Notably, in 1899, the Japanese government demolished the temple and rebuilt it as a school, leading to the relocation of the Wind God to the Penghu Tianhou Temple (Y. Chen, 2006). Nowadays, the Wind God is enshrined in the Penghu Tianhou Temple.

The earliest record of wind adaptation: Caizhai

Another significant point on the wind resilience trajectory that started during the Qing Dynasty is Caizhai. Caizhai refers to a garden structure constructed with basalt or coral stones to shield crops from the adverse effects of strong winds. Caizhai marks the earliest record of wind adaptation at the community and individual level, with historical evidence dating back to 1873 (Ding, 1873). However, Caizhai structures were believed to be present on the islands before this recorded instance. Caizhai structures were typically considered private property, associated with specific families, and often built adjacent to houses. Interestingly, some Caizhai structures were repurposed houses (Hui-Cheng, 1993); when a house became dilapidated, the owner would construct a new one adjacent to the old structure, with the ruins then serving as areas for cultivating vegetables.

In summary, the trajectory of wind resilience during the Qing Dynasty predominantly featured in governmental records, focusing primarily on documenting the impacts of wind and customs related to wind adaptation.

(2) The Japanese colonial period (1895- 1945)

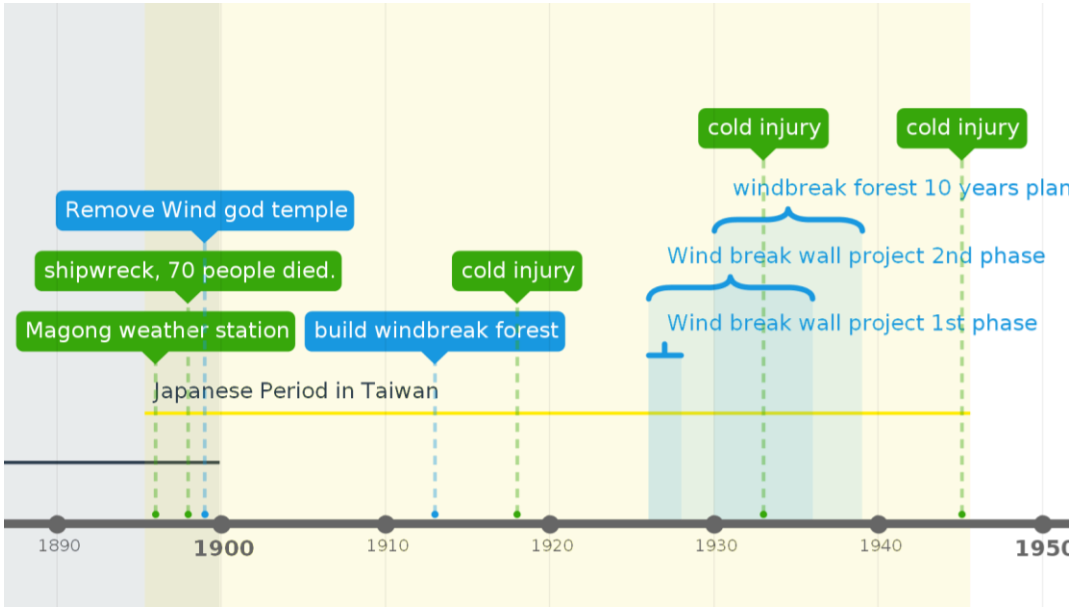


Figure 11 Highlights the trajectory of wind resilience in the Japanese period

Establishment of meteorological observatories

Firstly, alongside colonialism, the Japanese Empire ushered in modernity to Taiwan (Hsia, 2002), introducing advancements in various sectors, including meteorology, see Figure 11. While the Qing Dynasty had previously set up the Yuwengdao Lighthouse in 1879 for weather observations (Xu 1997), the Japanese administration took significant steps to enhance meteorological capabilities. Notably, the Magong Meteorological Observatory station, the first specialized weather observatory in Taiwan, was established by the Japanese colonial government in 1896, just a year after Japan colonised Taiwan. Situated 10 meters above sea level and relatively free from the surrounding buildings that would later affect observation data, this station provided accurate weather information. The meteorological data collected here were also transmitted monthly to the Shanghai Xujiahui Meteorological Observatory, signifying the early beginnings of systematic weather monitoring in the region.

Starting the windbreak forests

The second crucial development in the wind resilience trajectory was the initiation of windbreak forest projects (Taisaku, 2020). These large-scale plantation initiatives aimed to mitigate the impact of strong coastal winds. The concept of planting windbreak forests was first introduced during the Japanese colonial period in 1913, and the plant, Leucaena leucocephala, was introduced.

Drawing from the experiences of severe monsoons on Penghu, Leucaena leucocephala serves a dual purpose. Not only does it function as a wind protection plant, but it also serves as a valuable resource for firewood. This invasive species rapidly covered the Penghu landscape (Quarterly, 1992), and it is still a consent on Pneghu. The Japanese empire in Penghu devised a ten-year plan for windbreak forests. Recognising the importance of addressing weather-related agricultural challenges to boost production, the Japanese empire implemented measures such as constructing windbreaks made of straw and clay and planting windbreak forests to shield fields (Isaburō, 1932). These windbreak forest policies remain in effect today, safeguarding Penghu's coastal areas and contributing to sand stabilization on the islands.

Construction of windbreak walls

The final and most time-consuming innovation during the Japanese colonial period was the construction of windbreak walls, a project undertaken from 1926 to 1928. These walls, designed as an effective means to protect crops from strong monsoons, initiated a decade-long endeavour in 1929. Differing from the household-scale Caizhai, these windbreak walls stretched for kilometres, standing four feet high and featuring a substantial thickness. Constructed primarily from basalt and coral rocks, these walls incorporated an additional layer of tall subtropical grasses (satin tail) measuring five to six feet in height. This grass layer served as the initial barrier against the wind. Within this layer, an eight-foot-wide strip of Australian pine trees was densely planted, with a density of 42 trees per 3.31 square meters, further shielding against seasonal winds (Isaburō, 1932). These walls were strategically positioned at the northern edges of significant fields and oriented against the direction of prevailing seasonal winds.

In summary, the trajectory of wind resilience during the Japanese colonial period marked a new phase in the region. It encompassed the introduction of a modern meteorological observation system, epitomised by the Magong meteorological observatory station, which held strategic significance for Penghu's location between China and the main Taiwan island. Weather data is essential in case a regional military conflict happens. Additionally, the implementation of windbreak walls and windbreak forests represented innovative measures specifically tailored to address the unique challenges of monsoon

seasons and to block wind from entering living areas. The subsequent mapping section will offer a detailed comparison between windbreak walls and windbreak forests.

(3) The Taiwanese government (1946- now)

A wealth of archives and data characterizes this period compared to the preceding Qing Dynasty and Japanese Empire eras, see Figure 12, the details can be found in Appendix D. Critical developments in wind resilience during this era are encapsulated in four distinct dimensions: National Disaster Management, wind power, the continuation of wind policies from the former regime, and wind as a cultural expression. Subsequent sections will delve into each of these dimensions in detail.

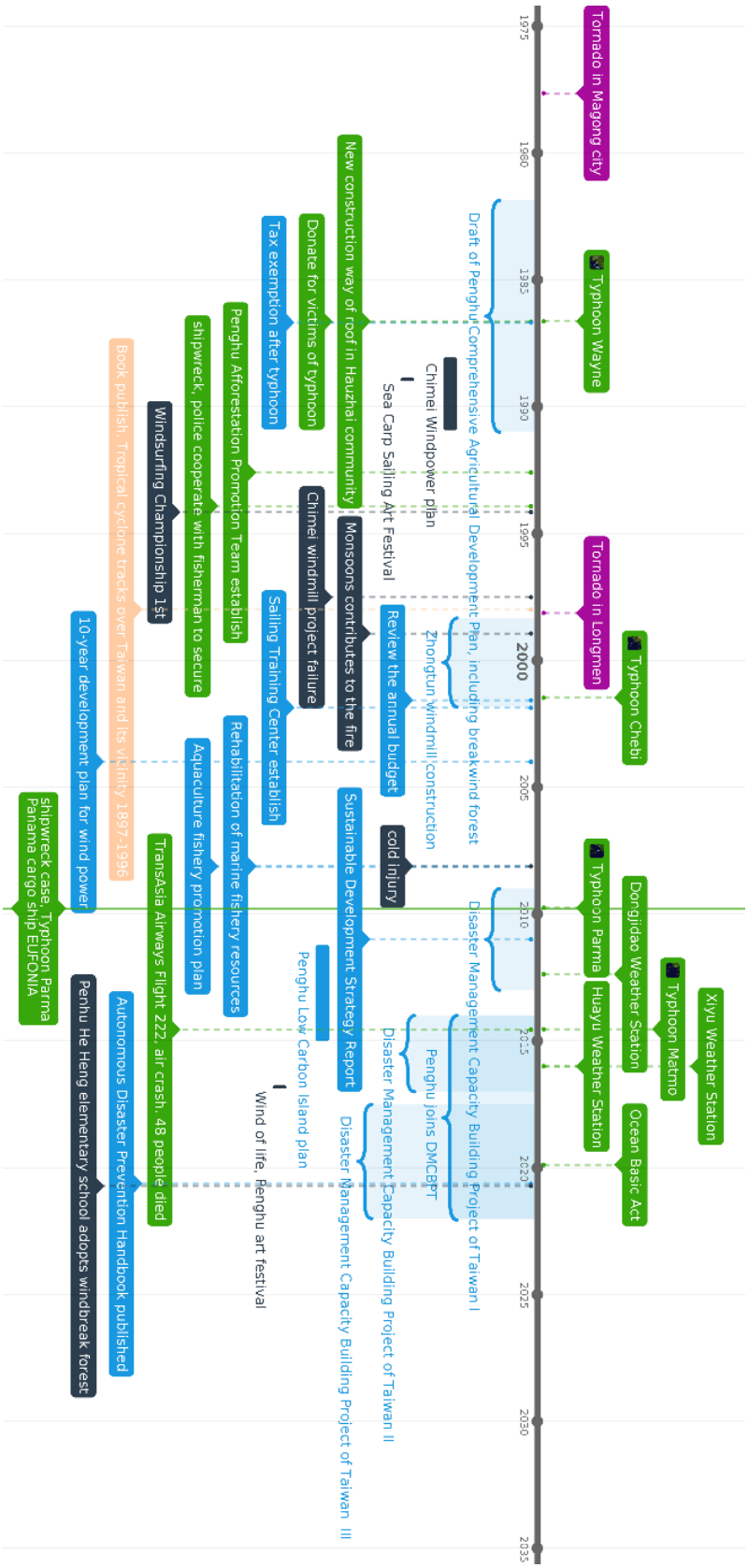


Figure 12 Highlights the trajectory of wind resilience after WWII until now

Establish new meteorological observatories and continuation of planting wind forests

In addition to the Mogong meteorological observation station, which was established during the Japanese colonial period, three additional stations were established after World War II: Dongji, Huayu, and Xiyu. As of the present day, both the Huayu and Xiyu meteorological observatory stations were most recently established in 2016, while Dongji station was founded in 1962. Dongji station, situated at an elevation of 43 meters above sea level and lacking shelter, currently stands as the most prominent source of weather data for the Penghu archipelago. In contrast, the Magong Meteorological Observatory, the oldest of its kind, is surrounded by numerous buildings due to population expansion.

Another noteworthy facet of Penghu's ongoing wind policy pertains to windbreak forests. Following the Japanese windbreak forest policy, the Penghu Government initiated a transition to using Tamarix aphylla as the primary plant species for windbreak forests in 1992 (B. Lin, 2020), replacing Leucaena leucocephala. Tamarix aphylla is a highly adaptable species, thriving in various climatic and soil conditions, including arid environments and deserts. Its extensive and deep root system endows it with remarkable drought tolerance and resilience to the strong monsoons that frequently affect Penghu.

Disaster management: From national to regional

Another crucial aspect of wind resilience lies in the domain of national disaster management policies. Since the year 2000, the Ministry of the Interior in Taiwan introduced the Disaster Prevention and Protection Act (Disaster Prevention and Protection Act, 2022). This legislative action signalled the Taiwanese government's commitment to fostering a deepened sense of local community awareness and systematically exploring disaster prevention and management through comprehensive policies. The next initiative, the Disaster Management Capacity Building Project of Taiwan (2009-2022), aimed to further enhance disaster preparedness. This project recognised typhoons as the most significant natural disasters affecting Taiwan. Article 2 of the Disaster Prevention and Protection Act explicitly excludes the monsoon from the windstorm category, although the wind speed of monsoons sometimes reaches typhoon level. Here, this situation underscores a notable gap between the national definition of disaster and the local conditions in Penghu.

The Penghu County government joined the Disaster Management Capacity Building Project during its second phase, starting in 2014, rather than at the initial phase. This decision reflects how an island county interfaces with central governance. In line with national guidelines, the Penghu county government issued a handbook on Autonomous Disaster Prevention (Penghu Government 2021b), which did not include the monsoon but pointed out landslides as a consequence of typhoons. Ironically, landslides are non-existent in Penghu due to its flat terrain. Recomfirmedly, the national policy for disaster management needs to adjust to local needs.

The main objectives of the second phase of the Disaster Management Capacity Building Project (2014-2017) are to evaluate disaster potential characteristics and establish a disaster preparedness system (Penghu Government, 2018a). The third phase of the Project (2017-2022) has centred its efforts on community resilience. The third phase introduces new topics, such as the training system for the Taiwan Disaster Relief Volunteer Corps, enhancing the resilience of local governments and communities. The Phase III plan emphasizes continuously strengthening local governments' disaster preparedness capabilities. It promotes the involvement of civil society and organizations in disaster prevention tasks while establishing plan assessment indicators. Additionally, the Penghu government's Fire Bureau introduced a new policy with the establishment of the Disaster Management Office in 2019, enhancing the capacity to integrate resources from various departments when facing an approaching typhoon.

Set up the wind power station

This dimension centres on initiatives related to sustainable wind energy practices, from dealing with the impact of wind to the use of wind. The first experimental site was established in Chimei, the southernmost island of the Penghu archipelago. Unfortunately, the wind turbines tested by Taiwan Power Company in Chimei faced difficulties overcoming the regional disparities in wind power in 1997, and it turned into a failed project. To harness the wind resources of Penghu for green energy production, Taipower subsequently installed wind turbines in Zhongtun starting in 2001. The Zhongtun wind power station now features eight wind turbines and is the second-largest wind power station in Taiwan. It contributes approximately 12% of the total power generation for the main island of Penghu. Moreover,

the Zhongtun wind power station has evolved into a tourist attraction where visitors often take photos with the wind turbines.

Another wind power station was established in Longmen in 2014. In 2014, the Ministry of Economic Affairs introduced the Penghu Low Carbon Island Wind Power Project, with Taipower designated as the responsible entity for the initial phase of wind power development. This project faced challenges related to cultural considerations, specifically Fengshui issues, which ultimately led to its failure. Fengshui, which literally means ''wind-water,'' represents one of the cultural expressions deeply ingrained in Penghu culture. Also known as geomancy, Fengshui is an ancient traditional practice aimed at harmonizing individuals with their surrounding environment (M. Liu, 1998).

Wind turbine and Fengshui

In 2014, the Ministry of Economic Affairs initiated the Penghu Low Carbon Island Wind Power Project, selecting the best wind field on Penghu for this purpose. In addition to the Zhongtun wind power, Taipower selected the Longmen community as the location to install wind turbines, starting in 2018. See google satellite of Longmen community and wind turbines, Figure 13.

From the government's perspective, the Penghu Low Carbon Island policy aligns with sustainability goals and is linked to wind resilience concerning monsoon use. Wind power represents a transformation from being impacted by the wind to harnessing its potential.

In 2018, Taipower erected three wind turbines in the Longmen community, sparking a conflict. The initial plan was to install six wind turbines, but this sparked protests when implemented without community consent. Longmen residents expressed their discontent. *''The construction was started secretly without the consent of the community members, and the sound of the trial operation was very loud. The current county major has guaranteed that the wind turbines will not run. Who knows what will happen after the next election? The protesters were also arrested by the police!'' (PI 028, 2022).*

The ignition point of this conflict involves two communication problems and one cultural issue. Firstly, there was a communication issue between Taipower and the government. Both institutions blamed one another, claiming the other was responsible for installing the three wind turbines without community consent, causing irritation among community members. Second, a communication problem emerged between Taipower and community members. Taipower invited the community to a meeting to express their opinions and even suggested an alternative location for the wind turbines, but community members felt their input was disregarded. *''Taipower invited us to a meeting, we expressed our opinions and we even helped them to find a better place to set up the wind turbines, they did not take our opinion seriously! And the location they chose will destroy our Fengshui.'' (PO 006, 2022).* These communication breakdowns eroded trust between institutions and the community. Lastly, a cultural issue underlies the conflict, though it has not been given sufficient attention.

Figure 13 Longmen community and wind turbines, google satellite (Map data ©2023 Google) author modified.

In this conflict case, the cultural issue was neglected, resulting in the three wind turbines becoming non-functional and ultimately leading to the suspension of the wind power project. The selected location of the wind turbines conflicted with Fengshui, a practice widely observed among Penghu residents. When the cultural perspective was neglected and not respected, people disagreed with the policy, resulting in an escalation of the conflict.

Wind as a cultural expression

Lastly, cultural soft power plays a significant role alongside governmental wind management efforts. In 2016, the "Wind of Life — Penghu Art Festival" was organised by artists and local communities, drawing inspiration from the strong monsoon winds. The festival's narrative beautifully captures the essence of Penghu's relationship with the wind:

> "The winter in Penghu is sensationally exciting and surreal for many people. Every year, from October to March, the islands of Penghu are under northeast monsoons, of which the strength is close to moderate typhoons. The winds with the taste of sea blow into ears and push people moving forward as well as impact the culture of Penghu. Confronting such a powerful nature, people in Penghu have learned to adapt themselves to the unique weather. When the northeast monsoon comes, it is time to take a break, time for family and social activities. Wind of Life—Penghu Art Festival, signifies the winds of Penghu as the quality of seasons and domestic culture..." (J. Li, 2016)

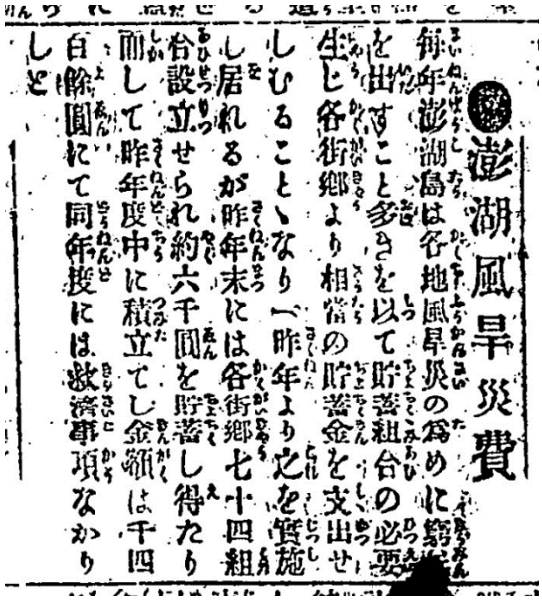
This narrative underscores the wind's profound significance in Penghu people's identity. The art festival aimed to bring together artists and community members to explore the image, role, and impact of the wind on Penghu. It holds a special place in the wind resilience trajectory for two key reasons. It was the first art festival dedicated to a strong monsoon, setting a precedent for subsequent wind-themed art festivals. Secondly, it drew attention to a natural, seasonal phenomenon to integrate with a cultural perspective. Through artistic expression, Penghu residents reframed and reconsidered the meaning of the wind in their lives.

In summary, the post-WWII data on the wind resilience trajectory covers a broader spectrum of aspects than the previous regimes. However, it's essential to note that this doesn't necessarily imply that Penghu residents are now more resilient to the wind than before. Rather, it reflects greater accessibility to archival data in recent times. After WWII, in addition to inheriting wind management policies from former regimes, several new dimensions have emerged that encompass the utilization of wind resources, such as wind energy initiatives, collaborations with the educational system, and the creation of art festivals like Wind of Life. These findings are the outcome of extensive archival research.

4.2.2 Three patterns of wind resilience from the institutional level

Three key findings emerge at the institutional level after identifying the starting points related to wind resilience across different historical regimes. Firstly, there has been a shift in the perception of wind disasters. Secondly, each new regime has adopted and continued the strategies of its predecessor. Lastly, there has been a transition in wind policy from passive record-keeping of the impacts to proactive preparedness. The following paragraphs elaborate on these evolving patterns of wind resilience from an institutional perspective.

Changing the perception of wind disaster


澎湖風旱災費

毎年澎湖島は各地風旱災の爲めに窮
を出すこと多きを以て貯蓄組合の必要
生じ各街鄉より相當の貯蓄金を支出せ
しむることゝなり一昨年より之を實施
し居れるが昨年末には各街鄉七十四組
合設立せられ約六千圓を貯蓄し得たり
而して昨年度中に積立てし金額は千四
百餘圓にて同年度には救濟事項なかり
し

Figure 14 Taiwan Daily news. The subsidy for Penghu wind and drought disaster (4th of April, 1911)

After reviewing the archive, I found the perception of wind disasters from the institutional level has undergone significant changes from the Japanese period to the present day. During the Japanese colonial period, monsoons in Penghu were associated with droughts, leading to food shortages and categorising monsoons as a type of wind drought disaster. This perception is supported by historical evidence, including reports in the Taiwan Daily News (1896-1944) (MainlandTelegraph, 1911), an influential official daily newspaper during the Japanese colonial period. The newspaper, see Figure 14, highlighted the linkage between wind and drought disasters and emphasised the importance of implementing savings portfolios to

assist affected communities. Within the framework of the Japanese government's disaster management, monsoons were classified as a type of disaster due to their impact on agriculture. Monsoons brought in salty air, leading to soil salinization and posing a threat to crops. Additionally, the strong monsoons damaged growing crops, resulting in shortages.

In contrast, as mentioned in the 4.2.1 section, the perception of wind disasters in the Taiwanese government today excludes monsoons. This shift is reflected in the Disaster Prevention and Protection Act issued by Taiwan's Ministry of the Interior in 2000. According to the Act, disasters are defined as hazards caused by various natural events, including windstorms, flooding, and earthquakes, among others. Monsoons are explicitly excluded from the Act's definition of wind disasters, which solely refers to windstorms, typically associated with typhoons. Indeed, despite the continued challenges posed by monsoons, including soil salinisation and the potential for high wind speeds comparable to moderate typhoons, the perception of monsoons as disasters has undergone a dramatic shift. This change can largely be attributed to the changing economic structure of Penghu.

Over time, agriculture has declined as the primary industry, while tourism has become the dominant economic pillar. During the Japanese colonial period, agriculture was Penghu's primary food production source. In the 1930s, 70% of the population in Penghu worked in agriculture (Isaburō, 1932). However, by 2015, only 15.8% of households in Penghu were engaged in farming, as reported in the 2015 census (Penghu Government, 2016). Tourism has since become the main economic activity in Penghu (Wu & Tsai, 2014), and most food is now imported from the main island of Taiwan. This shift in economic reliance may explain why monsoons are no longer considered a regional disaster.

In summary, the perception of wind disasters has shifted from associating monsoons with drought and disaster during the Japanese period to excluding monsoons from the disaster category in the contemporary Taiwanese government's perspective. This change in perception is influenced by shifts in Penghu's economic structure and the evolving role of agriculture and tourism in the region.

Learning process among regimes

It is evident that wind-related concerns demand attention from the successive Penghu regimes. The trajectory of wind resilience on the islands is not marked by abrupt discontinuity but rather a sense of continuity. When these regimes formulate policies for wind governance, some policies persist and are reinforced by the succeeding administrations, while others prove unsuccessful. To illustrate this point, I delve into an example of wind policy transition from the Japanese colonial period to the Taiwanese government.

The wind policies implemented during the Japanese colonial period, encompassing initiatives like windbreak walls and windbreak forests, are documented in the book "An Overview of Penghu" (Isaburō, 1932). A relevant observation when assessing the current landscape is the opposite fate of these two policies. While windbreak forests continue to be actively maintained by the Penghu government, windbreak walls, on the other hand, have been abandoned. The discussion (section 5.2.1) will comprehensively explain the reasons.

Figure 15 Dongji island, windbreak wall (Abandoned) Behind the Donji weather station and lighthouse; Photo credit: Ouxiang Wu

The ambitious 10-year windbreak wall project undertaken by the Japanese empire represented a clever attempt to address two key issues simultaneously: 1) mitigating the adverse effects of the strong monsoon on the community and 2) enhancing crop yields by safeguarding crops against wind-related damage. However, this long-term project was abruptly halted as World War II approached. In essence, the policy's failure stemmed from its

failure to consider the needs and dynamics of the local communities. Post-World War II, apart from the lack of water resources in the windbreak wall area, farming in Penghu gradually declined, as previously noted. Today, importing food from Taiwan's main island is more convenient. Furthermore, houses are now constructed using concrete, affording sufficient wind resistance for security during the monsoon season. Windbreak walls were situated away from residential areas, and community members lacked the motivation to maintain them. Moreover, these walls had negative associations due to their association with forced labour. Figure 15 shows the abandoned windbreak walls on Dongji Island.

The attitude of wind police: passive to proactive

Upon examining the trajectory of wind resilience across different historical regimes, it becomes evident that the overall attitude towards winds has developed from a passive reaction towards wind to a proactive approach in governance. Primary source documents from the Qing dynasty about wind-recorded typhoon events and their corresponding impacts reveal that the government's response was confined mainly to providing relief funds (Lai, 1960, p. 288). In contrast, the Japanese empire sought to address the issue of crop shortages by implementing measures such as windbreak walls and windbreak forests. Subsequently, the Taiwanese government followed suit by adopting the wind policy of the Japanese empire and further augmenting their approach with the creation of additional harbours (see section 5.2.2) to mitigate storm surges and the utilisation of new technology in the form of wind turbines. This marked a notable shift in governance attitude, whereby the emphasis shifted from reactive responses to proactive implementation measures.

The trajectory of wind resilience offers a comprehensive perspective for analysing the historical occurrence of wind events and the corresponding responses from agents, especially at the institutional level. However, the analysis of the trajectory of wind resilience is constrained by the limited institutional-level archive, particularly in the case of the Qing Dynasty, where it is challenging to locate relevant documents on wind-related matters, except for sporadic records of wind impacts. Consequently, understanding the governance patterns during the Qing Dynasty era is a difficult task. Nonetheless, it is still possible to trace the

governance patterns of wind resilience in the Japanese Empire and the Taiwanese government, where the archival resources are relatively more accessible.

After examining the historical trajectory of wind resilience in Penghu on the one hand, this study aims to investigate the contemporary responses to wind by three key agents on the other hand: individuals, communities, and institutions. While wind is a naturally occurring phenomenon that is difficult to capture, its effects can be observed as it interacts with physical objects. Accordingly, The following section involves mapping the tangible objects within selected communities that demonstrate cultural importance to wind resilience. This method is designed to trace the responses to wind, not only in terms of its path and impact but also by observing the responses of human agents. Such traces of wind responses are critical to understanding the dynamics between natural and cultural systems in the context of wind resilience.

4.3 Visualise the traces of wind in the landscape

In the preceding section, the trajectory of wind resilience was explored through an analysis of historical documents and archives. In order to observe the current responses to wind in the landscape, a mapping approach was employed. The responses to wind from daily life, which may not have been recorded in written documents, could thus be analyzed and facilitate an understanding of agents' responses to wind nowadays. It is important to note that these responses are actively applied in everyday life, especially during long-duration monsoons. The assumption is that these responses may contribute to the overall wind events, specifically referring to typhoons, on Penghu.

Besides examining the assumption, the objective of mapping the objects that intentionally respond to winds in the landscape is to gain a deeper understanding of the unique cultural association that the people of Penghu have with the wind, as well as to observe how different agents - individuals, communities, and institutions - respond to it. Additionally, mapping the traces of wind-responsive objects can provide insights into the traditional practices and customs associated with wind, which can be seen as the connection linking the past and the future.

Firstly, I will establish the correlation between communities and wind patterns, guided by the two mapping categories outlined in the methodology chapter: Category 1, which encompasses agent perspectives including 1) public, 2) private, and 3) religious; Category 2, which focuses on function-oriented perspectives including 1) reactions to wind, 2) uses of wind, and 3) impacts from wind. These categories are employed to differentiate between agent or function perspectives regarding responses to wind. Secondly, I will provide an in-depth explanation of the objects identified during the mapping process and their cultural significance. The objective is to elucidate the meaning embedded in these objects within their respective contexts.

Based on the mapping approach, the statistical data gathered is presented in the table below, which illustrates the various types of objects that respond to wind, the communities where they are located, and the corresponding number of objects. This data can be used to identify patterns in wind-responsive objects across selected mapping communities, providing valuable information for understanding the current time scale that responds to wind. Figure 16 and Figure 17 show an overview of mapping results.

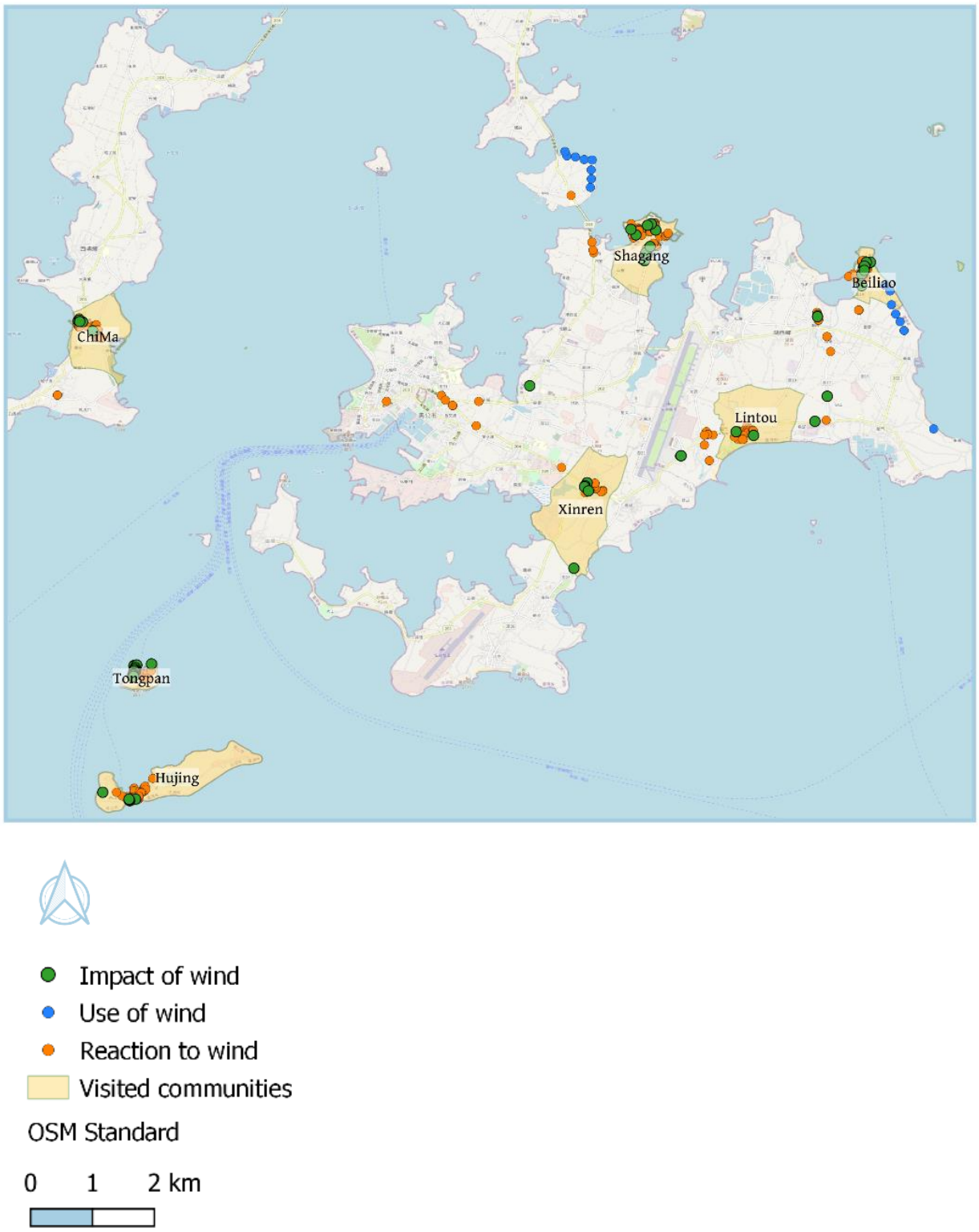


Figure 16 Overview of the functional orientated category

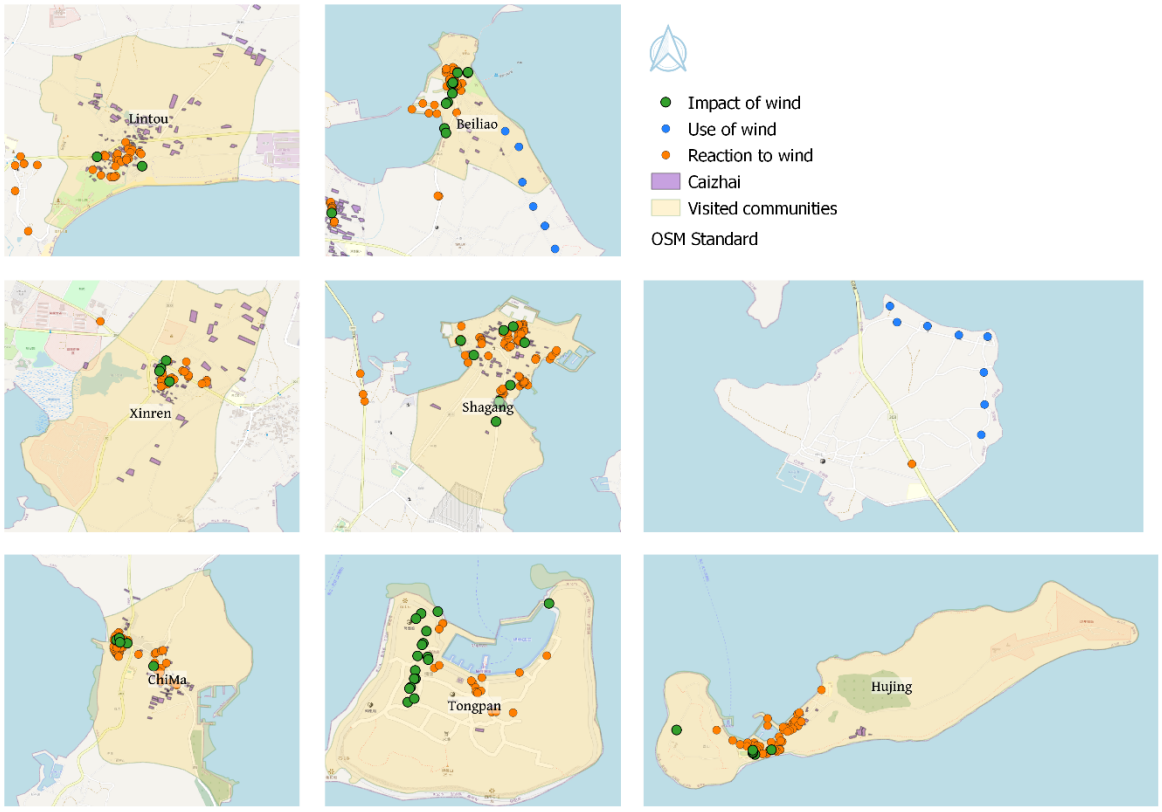


Figure 17 Overview of the functional orientated category of mapped communities

4.3.1 Overview of the mapping objects

A total of 561 objects were mapped, with the majority of objects located in settlement areas. The schematic diagram of mapped objects can be found In Appendix C. Regarding the agent perspective category, 42 objects fall under the "Public" category, indicating the involvement of institutions in responding to wind, such as billboards, wind turbines, and infrastructure. The "Private" category includes 447 objects, suggesting active engagement by private individuals in wind-related responses. There are 72 objects in the "Religion" category, highlighting the role of religious entities or beliefs in responding to wind. Table 7 shows the mapping objects with categories and definitions.

Table 7 Mapping objects with category and definition

Category1: Agent perspectives	Category 2: Function-oriented perspectives	Item	Definition	Number	Community	Amount
Public	Reaction to wind	Strong wind signal	A traffic sign, reminding people this is a wind shear intersection.	1	On the road	14
				6	XinRen	
				2	BeiLiao	
				5	ChiMa	
		Tree	Tie up the tree to keep it from being blown down by the wind.	5	LinTou	7
				2	BeiLiao	
		Bus stop	Bus stops with the break-wind glass wall.	4	On the road	6
				2	ShaGang	
		Wind break wall	Windbreak walls are bigger than private Caizhai, and are built by the government.	1	LinTou	6
				1	BeiLiao	
				2	ChiMa	
				2	HuJing	
		Water level gauge	Water level gauge is a measurement, that was painted on a ditch. The function is to measure the highest level of flood in the past and it warns people of the possibility of danger.	1	ShaGang	1

		Windbreak forest board	A billboard was set up by the government to show the area has been planted for windbreak forests.	1	BeiLiao	1
		Strong wind board	A signboard set up by the government. To warn people the wind is strong at the site.	1	TongPan	1
	Use of wind	Wind turbine	wind power machine.	6	BeiLiao	6
Private	Reaction to wind	Weight slabs/rocks	Put weight plates/rocks on things to prevent it from being blown away.	1	LinTou	17
				5	BeiLiao	
				5	TongPan	
				3	ShaGang	
				3	HuJing	
		House	To record houses in order to know the house direction. To see the correlation between wind direction and house direction.	9	LinTou	208
				21	XinRen	
				9	BeiLiao	
				21	ChiMa	
				30	TongPan	
				56	ShaGang	
				62	HuJing	
		Caizhai	Garden area surrounded by rocks or stuff.	15	LinTou	153
				7	XinRen	
				13	BeiLiao	
				8	HuXi	
				27	ChiMa	
				8	TongPan	

				54	ShaGang	
				21	HuJing	
		House: Pile up with rocks	The house is surrounded by basalt.	1	TongPan	1
		Door knob	The main entrance of a house.	8	XinRen	27
				4	ChiMa	
				4	ShaGang	
				10	HuJing	
				1	BeiLiao	
		Inner frame	Something is covered by a frame in order to break the wind.	6	XinRen	7
				1	ShaGang	
		roof reinforcement	a technique to reinforce a roof.	8	XinRen	11
				1	BeiLiao	
				1	ChiMa	
				1	HuJing	
		Protection wall	A wall in front of a house, in order to prevent the bad spirits and break wind.	2	ShaGang	2
		Window	Different techniques to prevent (salty) wind from getting into houses.	7	XinRen	21
				1	ChiMa	
				4	TongPan	
				1	ShaGang	
				8	HuJing	
Religious	Impact of wind	Ancestor hall	A shrine was built by people with the same surname and its function is to worship. Tablet records were broken by typhoons.	1	XinRen	12
				7	ShaGang	
				4	TongPan	

		Temple	The centre of faith in a village, the building worships to gods. Tablet records were broken by typhoons.	1	XinRen	4
				1	ShaGang	
				1	HuJing	
				1	ChiMa	
		Church	A building used for public Christian worship was recorded as broken.	1	HuJing	1
	Reaction to wind	Shigangdang	A stone with inscriptions, used for local worship. To stop the bad spirits, including wind, enter the community.	1	BeiLiao	16
				7	ChiMa	
				6	TongPan	
				2	ShaGang	
		Wind flag	A flag is tied to the top of a boat to expect safe fishing.	1	ChiMa	2
				1	HuJing	
		Five generals	Five general, spiritual worship is located at the imaginary protective border of communities.	5	HuJing	35
				5	BeiLiao	
				5	ChiMa	
				5	TongPan	
				5	ShaGang	
				5	ChiMa	
				5	XinRen	
		Pagoda	Pagoda was built by local people in the Qing dynasty (or even earlier). With different functions to prevent bad spirits or break wind.	2	ChiMa	2
Total objects						561

The second Function-Oriented Category, "Impact of Wind", includes 17 objects specifically focused on wind damage. "Reaction to wind" is the most prevalent category, with 503 objects indicating various responses related to reacting to or dealing with wind in diverse ways. There are 6 objects in the "Use of Wind" category, all associated with wind farms. These numbers provide an overview of the distribution of wind-related responses across different agent perspectives and functional categories, offering a view of the various responses to wind that manifest in the landscape nowadays. Certainly, it is important to note that Caizhai (garden areas) are not included in the table due to their locations outside of the mapping area. The method used for mapping Caizhai involved utilizing Google Satellite imagery to record them. This approach will be further elaborated upon in the upcoming section.

In the following paragraphs, I choose the most representative objects that are embedded in the Penghu cultural context for the analysis. The objects reflect the Penghu people's unique living conditions, respect for nature, and creativity and ingenuity in adapting to the strong winds. Exploring these crucial mapping objects allows us to gain insight into the culture of Penghu and its importance to wind resilience.

4.3.2 Objects of private

This section presents the three most impressive mapped objects, which demonstrate how private agents deal with wind in the landscape. 1) The Caizhai garden wall is the first choice because it constitutes a unique landscape feature of protection from wind on Penghu. 2) Cubic doorknobs, multi-functional objects that serve decorative purposes and facilitate property protection from the wind. 3) House orientation: While direction is not an object, the house orientation is worth examining. Below, statistical data is provided to show how houses are oriented.

How a settlement exerts its influence over the surrounding landscape has consistently been a significant gauge of its unique attributes and developmental trajectory. How inhabitants engage with the surrounding land serves as a mirror of their social and economic lifestyle, gradually getting over time to shape distinctive local cultural elements (P. Lin, 2020). In this section, two objects (One is Caizhai, and another is the cubic doorknob) and one object property (house direction) will be elaborated.

(1) Caizhai: farming walls

Figure 18 Caizhai on the Penghu archipelago. Photo credit: Ouxiang Wu

Caizhai (菜宅), which translates to "house for vegetables," refers to walled farming areas established on the Penghu Islands. Figure 18 above shows the Caizhais are normally close to households and of different sizes. Caizhai is the most representative adaptation to wind resilience in the landscape. These areas were strategically designed to mitigate the impact of the strong northeast monsoon and protect crops from wind damage. Islanders employed locally sourced materials such as basalt or coral rock from the islands to construct these protective walls. Caizhai structures typically exhibit square or U-shaped layouts, with their size contingent upon the dimensions of the respective plots of land. The architectural style of Caizhai exhibits variability, primarily comprising rectangular structures defined by two to four walls. The tallest side of these structures is oriented to face the direction of the prevailing monsoon winds. As determined through fieldwork measurements, windshield walls in Caizhai tend to have an average height ranging from 1.7 to 2 meters. Furthermore, the construction of Caizhai takes into account considerations related to the allocation of irrigation water

resources and land utilisation practices (Yu-huang et al., 2010), reflecting a thoughtful approach to agricultural planning, especially to protect crops from monsoons. Within these enclosures, crops are organized by height, with taller plants such as papayas, corn, or bananas positioned closer to the protective walls, followed by shorter plants like peanuts.

Figure 19 The locations of Caizhais among communities based on the Google satellite image, produced by

The selection of Caizhai as a focal point of investigation is significant for several reasons. Firstly, it is an iconic cultural landscape symbolising wind resilience on the Penghu Islands. Secondly, the cultural landscape of Caizhai serves as a demonstration of smaller windbreak walls. This implies that Caizhai, as a form of wind resilience adaptation, influenced wind policy during the Japanese empire. The Japanese empire learned from these private Caizhai structures and afterwards scaled up the concept to create windbreak walls. Third, it represents one of the earliest adaptations to wind-related challenges, as discussed in Section 4.2.1. Historical records indicate the presence of Caizhai, dating as far back as 1873, and it remained a prominent feature of the cultural landscape until the early 20th century. Despite the decline in agriculture and the utilisation of Caizhai for subsistence farming purposes in contemporary times, traces of these wind resilience structures persist within the landscape.

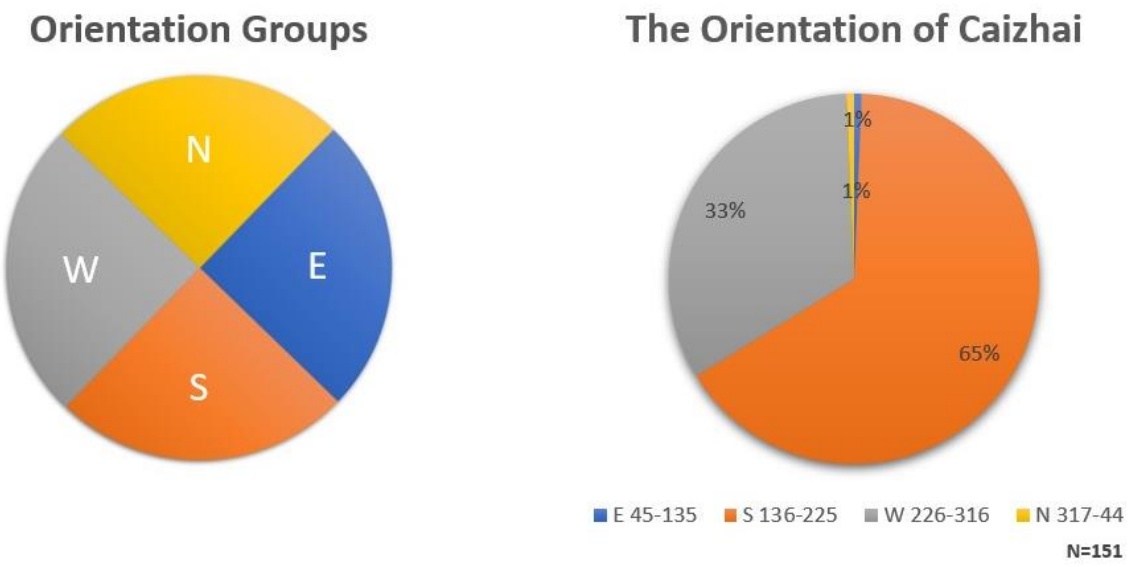


Figure 20 Caizhai orientation groups and the orientations, n=151

Based on the fieldwork and satellite imagery from Google and the dataset collected by the former research project (Streiter & Zhan, 2022), 464 Caizhai structures were identified within the selected communities (). Out of these, 151 Caizhai structures had their orientations measured to examine their relationship with the direction of the monsoon winds.

To facilitate the analysis, the orientations of Caizhai were categorized into four primary directions as follows: 1) East: Ranging from 45 to 135 degrees, 2) South: Ranging from 136 to 255 degrees, 3) West: Ranging from 226 to 316 degrees, 4) North: Ranging from 317 to 44 degrees. The methodology employed for determining the orientation of Caizhai involved selecting the highest wall of each structure and identifying its leeward side. The resulting data indicates that most Caizhai structures, precisely 98%, are oriented towards the South and West directions. It is exactly opposite from the monsoon direction of the Northeast. Figure 20 shows the statistical result.

(2) Cubic doorknobs: decorative housing elements

There are 27 cubic doorknobs mapped among selected communities. In the 16th century, Penghu served as a stronghold for immigrants who brought architectural styles from their Qing dynasty homelands, some of which continue to exist today as Szu Chu Tou (四櫥頭), or Courtyard Houses. Within these Penghu buildings, distinctive wooden cubic doorknobs are

shaped like persimmons. Initially, these doorknobs held ornamental and symbolic significance, serving as good luck charms for the families residing in these houses, believed to protect them from bad luck, including the force of the wind. The symbolism associated with the persimmon-shaped doorknobs arises from the homophonic quality of the word for persimmon (柿子/事事如意) in Mandarin. The pronunciation of "shi" for persimmon is phonetically similar to "shi", meaning "things", which forms an idiom expressing a wish for the family: "everything goes well" or "事事如意" (shì shì rú yì). This linguistic connection adds to the symbolic meaning of these doorknobs, emphasising the desire for overall prosperity and good fortune within the household. The Figure 21 below is a wooden cubic door Knobs.

However, these doorknobs also possessed highly practical functions. In the context of Penghu islands, they served as bollards for tying bars and poles, functioning as anchor points for knots that helped secure doors tightly against strong winds. When residents of the islands needed to leave their homes for a period, it was customary to exit through the side door and tightly secure the main door. This practice prevented the wind from forcefully breaking open the main door and causing damage to the house. The example of these doorknobs illustrates how their use evolved over time, expanding from their decorative and spiritual functions to include practical roles in safeguarding homes from the wind's force.

Figure 21 Wooden cubic door knobs on the Penghu archipelago

(3) House orientation

The settlements in Penghu are typically located in the low-lying land and exhibit a clustered pattern (Hui-Cheng, 1993, p. 50). This settlement formation is not arbitrary; rather, it is the result of intended planning by immigrants. They chose to build houses in clustered arrangements to mitigate the impact of monsoons and safeguard community members against pirates (Kuan, 1987). Consequently, house orientation serves as a valuable indicator of the decision-making processes of these early immigrants.

House orientation is a property rather than a subject. A house encompasses various objects related to or part of it, including roof reinforcement, house protection walls, or double-layered windows. House orientation is the consideration of the leeward side with respect to monsoons. Figure 22 shows the statistical result. The total number of house orientations in the dataset combines fieldwork and data from previous research projects, resulting in 708 houses with orientation recorded in degrees. I divided orientation groups to align with the Caizhai orientation groups. The result reveals that 80% of the houses face the South and West, shielding themselves from the northeast monsoon winds.

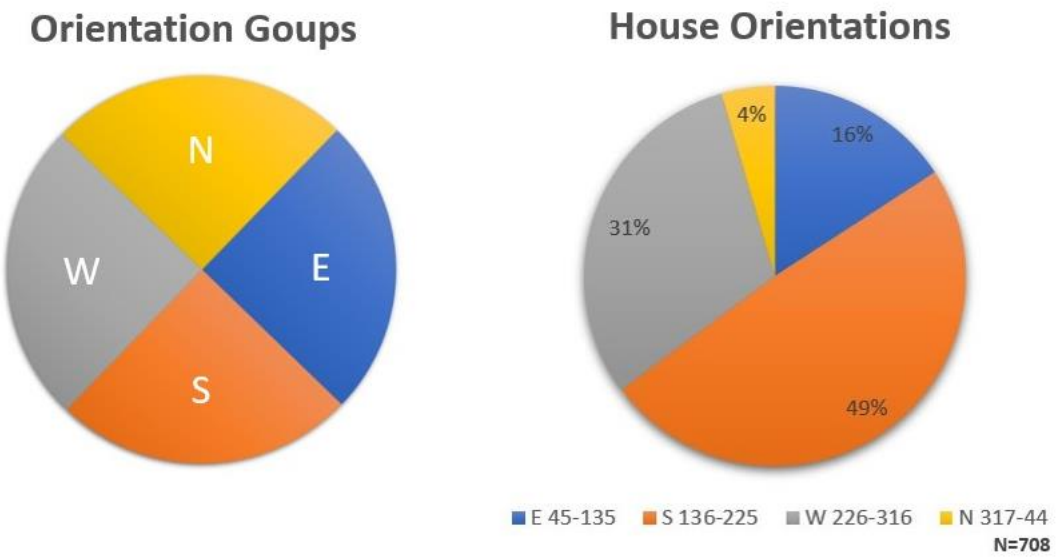


Figure 22 House orientation, n=708

4.3.3 Objects of religion

Religion holds a central place in every community on the Penghu archipelago, evident in the location of temples at the heart of these communities. Every centre of a community is the temple. Wind resilience is also reflected on the religious level, as evidenced by various objects

I mapped during fieldwork. These objects include tablets that mention temples damaged by typhoons, wind flags attached to boats to seek good luck, pagodas believed to protect communities from malevolent wind spirits, and the Shigangdang and Five Generals. The most representative religious objects are Shigangdang and Five Generals. Both of them demonstrate how communities entrust talismans to keep their hearts at peace. Therefore, the following paragraphs introduce these two objects:

(1) The spatial arrangement of the Five Generals

Religion is part of culture, with religious practices serving as the focal point of people's daily, seasonal, and annual routines. Five Generals are a common belief around Taiwan's main island, Penghu, Kinmen, and China. Penghu maintains a more complete structure of the Five Generals compared to Taiwan's main island. Due to urban expansion in Taiwan, many generals have been removed or relocated. The challenging environmental conditions have prompted communities to turn to their beliefs, seeking relief and peace through religious practices (Y.-L. Chen, 2011). The role of spirituality in dealing with wind is abstract and difficult to grasp, however, it is possible to identify in Penghu geographical spaces marking perceived wind-safe zones: The Five Generals and Shigandang.

The Five Generals, see the schematic diagram in Figure *23*, is a visible marker representing the protective power attributed to the Taoist generals. In this system, the main deity of a temple designates authority to his or her five generals. These Five Generals are located around the community: east, west, south, north, and centre. The schematic diagram illustrates this belief system, a representation based on Tseng's Five Generals research (Tseng, 1999, p. 27).

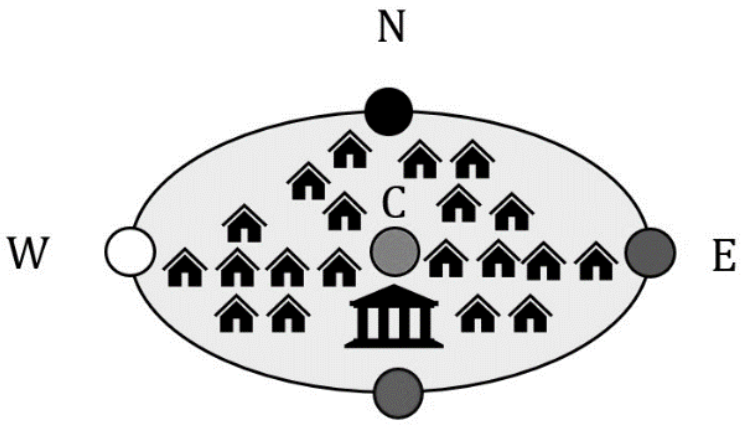


Figure 23 Relative location among the Five Generals, temple and the community area. Reproduced from Tseng Kuang-Ti (1999)

From the emic perspective, older generations strongly believe that the Five Generals will protect their communities. The Five Generals are set at the border of the communities to defend against the evil spirits, wind is treated as the source of diseases. Community buildings are often situated within the area covered by the Five Generals. From the etic point of view, this protection is spiritual and physical. Spiritually, the generals guard against evil spirits, wind, and water. Physically, they restrict a relatively secure area, reinforced by man-made protective structures and natural defences provided by plants and topography. Beyond this area, one typically finds flat lowlands and the open sea. Figure 24 shows a concrete form of a five general.

The locations within the Five Generals are not always fixed and can change, especially when communities expand. In such cases, the positions of the generals may be adjusted to encompass these new community extensions. Essentially, when the Five Generals expands, the area under its protective influence also grows larger. This expansion often involves an annual pilgrimage of the Five Generals and a grand celebration. These events symbolize the

Figure 24 Five Generalss has various forms. Such as shrines, wooden sticks, or the concrete structure like the photo present.

continued protection of the community by these generals on an annual or even bi-monthly basis. During these worship ceremonies, community members exchange information, strengthening cultural identities and fostering a sense of community. This sense of community and shared identity, as documented by various studies (Gómez-Baggethun et al., 2012; Renjiang Yang, 1993), promotes mutual assistance and well-being. This unity and mutual support extend to various aspects of community life.

Interestingly, Penghu people believe that the Five Generals protect them from bad spirits, which include wind and water. However, during interviews, people expressed a different cognitive understanding of the relationship between wind and the Five Generals. According to their reasoning, the Five Generals are not related to wind. This inconsistency in statements highlights the two different levels at which wind is conceptualized.

On one level, wind is conceptualized as a natural phenomenon, but on another level, it is seen as a form of disease or an evil force. This dual conceptualization of wind demonstrates that it has multiple dimensions in the cultural understanding of the people of Penghu.

(2) Shigandang

Besides the Five Generals, Penghu also has another critical religious object known as Shigandang. Shigandang, which is believed the "stone can stop evil" (止煞), is a stone tablet inscribed with writings. What makes this object unique is its specific placement; it is usually located in spiritually dangerous places identified by community members, such as intersections or areas prone to accidents. The practice of worshipping Shigandang is believed to be older than the Five Generals in Penghu, Most of the interviewees mentioned that Shigandang is a practice imported by immigrants from China. However, there is no record of when Shigandang was established in Penghu. One key difference is that while the temple committee manages the Five Generals, local community members typically manage Shigandang.

Shigandang is common throughout East Asia and is particularly dense in Taiwan, with Penghu being the area with the highest concentration of these objects (Renjiang Yang, 1993). Its significance to the community is emphasised by the unique inscriptions on Penghu's

Shigandang, with the term "Wind Stop (止風)" appearing. The belief is that when the wind encounters Shigandang, it will come to a halt and not blow into the communities, protecting them from the wind's potentially destructive effects.

The distinctive inscriptions found on Penghu's Shigandang tablets highlight the unique cultural expression of the Penghu Islands. Due to the persistent challenge of intense monsoons faced by Penghu communities, some of these tablets are inscribed with the characters "Wind Stop", see Figure 25. This inscription proves the islanders' adaptation to their environment and their belief in the protective power of these stone tablets against the bad spirit brought by the wind.

Figure 25 Shigandang with wind stop character

The imaginary protective area from wind

Although some residents claim that Shigandang and the Five Generals, which function as talismans, are unrelated to wind, these folk beliefs are intricately connected to the islanders'

cognition of wind. The concept of "煞 (sha)," meaning evil spirit, is introduced here. These talismans are believed to prevent evil spirits from entering the community.

These talismans are thought to establish an invisible protective area, effectively exorcising evil and showing peace. Both the Five Generals and Shigandang serve to delineate an imaginary space of safety, demarcating dangerous areas from safe ones within the community. These objects are not merely religious objects, they profoundly influence and reflect the perceptions and responses of islanders to the challenges posed by the wind.

This conceptual imaginary space offers cognitive security for islanders, creating a sense of protection and safety. The symbolic objects are strategically placed at the edges of communities or dangerous intersections. These established locations are not random but reveal islanders' nuanced, situated knowledge concerning the combination of wind and bad spirit.

Within the context of the Five Generals and Shigandang, the term "wind" takes on a broader and more symbolic meaning. It does not solely refer to specific winds like monsoons and typhoons but encompasses all forms of wind, including daily wind. These talismans aim to prevent the junction of wind and bad spirits. Wind serves as the medium through which these bad spirits are believed to be carried. The cognitive association between wind and spirits is deeply rooted in East Asian culture, and Penghu, known as the "wind islands," exemplifies this cultural belief through its unwavering faith in talismans. These beliefs reflect the idea that wind can act as a carrier for evil forces. Therefore, wind as a medium emphasises the significance of these protective talismans and imaginary spaces in preventing these bad spirits from invading the community.

4.3.4 Objects of public

Among the mapped objects in the public category, there are 42 items. These objects are set for public-oriented services in responding to wind-related challenges and applications. Examples of such objects include strong wind signals designed to alert individuals about wind shear intersections between buildings, bus stations strategically positioned on the leeward side to shield people from monsoons, wind turbines for producing wind power. When examining these public objects, except for wind turbines used for wind power generation and

flood height markers to measure flooding during typhoons, most mapped public objects function as warning signs for monsoons.

It is worth noting that the number of objects in the public category is lower compared to the other two categories (private: 447, religious: 60), indicating that the mapping area is more dominated by private objects that react to the wind rather than public objects. However, it's important to mention that in the outskirts area of the Five Generals, there are still windbreak forests and relics of windbreak walls from the Japanese colonial period. Consequently, in the following section, I will provide a more detailed introduction to windbreak forests in this context. About windbreak wall please see Chapter 4.2. The map below shows the windbreak forest on Penghu, the metadata comes from the Forestry Bureau, and this map is generated by author (Forestry Bureau, 2021). In Figure 26, there are different types of conservation forests placed along the shorelines and their main focus of protection. In addition to the Penghu County Forestry and Park Management Center, the educational system is an active part in the maintenance of windbreak forests.

Windbreak forest

Figure 26 displays the windbreak forests on Penghu, which consist of various types. The left map illustrates the coastal area of the northern Penghu archipelago, which is densely covered by these windbreak forests. Moreover, wind management of windbreak forests does not only apply within governmental units but also extends to the educational system. In 2020, the Forestry and Nature Conservation Agency signed a cooperation agreement with The Heheng Elementary School (合衡國小). Aiming to protect the windbreak forest together. The Heheng Elementary School in Xiju trains school children to replant and care for their neighbouring windbreak forest (Environmental Information Center, 2020). This way, windbreak forest management becomes further institutionalised, allows formal knowledge transfer between regimes, and shapes cultural values through education. The program of wind education is a choice of cultural value, showing windbreak forest is vital to be integrated into the educational program.

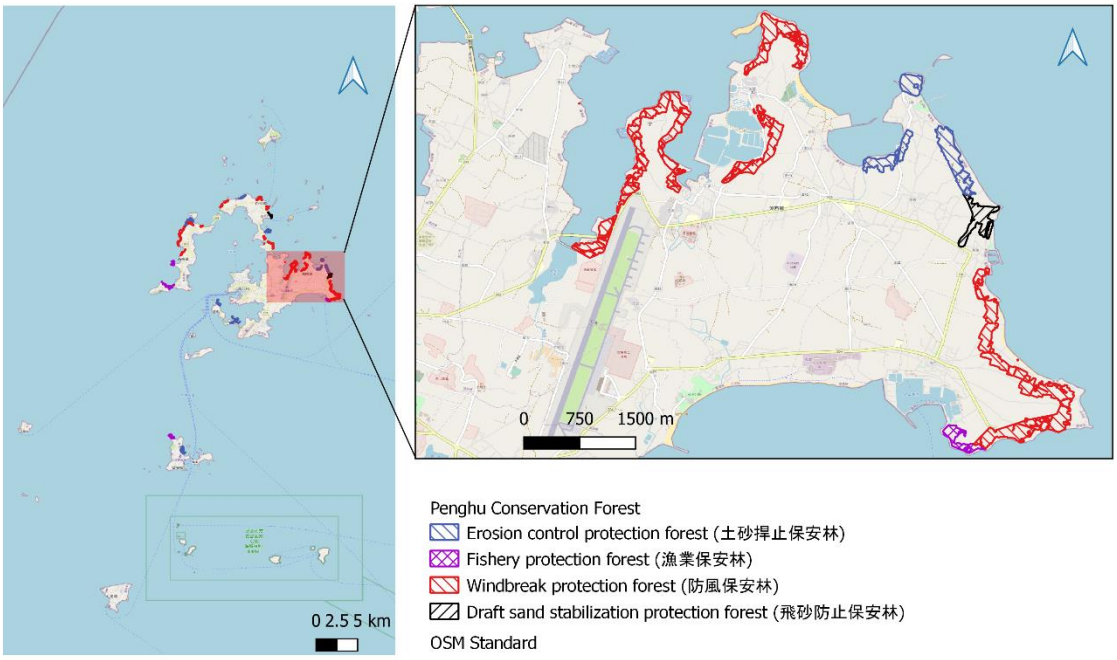


Figure 26 Conservation forests on the Penghu islands

4.3.5 The respective role of agents in wind resilience

In terms of the category of agents perspective, I found agents deal with wind according to respective roles. Private, including individuals and part of the community- because sometimes the community crosses into the religious category, wind resilience is most commonly reflected in architectural styles, such as the orientation of buildings to prevent the northeast monsoon winds, the use of small windows and second window layer just right behind the first one to resist the wind, and the high walls of buildings. Settlements are also often located behind the higher ground in the north, such as in BeiLiao, which has a higher elevation to protect the community from the wind. Among the private objects, Caizhai is the most representative wind resilience cultural landscape in Penghu as mentioned.

The outermost layer of wind resilience is guarded by institutions as the guardians of public areas. This refers to the role played by the government in public management. Examples include strong wind signals on major roads, windbreak forests on the outskirts of settlements, and flood height markers related to harbours and storm surges. It is clear that the government's responses to wind are primarily focused on the first line of contact with the northeast monsoon winds on Penghu before the wind enters the community. In Figure 27 illustrates the guarding areas among agents. It displays the geographical protective zones

from wind, with institutions positioned on the outermost layer, community-level protection in between, and individual protection within the village.

In addition to the aforementioned private traces of wind in the settlement and public areas, I found that religious traces of wind play an important role in between, such as Talismans: Shigandang, and the Five Generals. These belief systems use imagined spaces to delineate a safe boundary that not only is believed to resist the wind but also acts as a guardian of the community. Temples are always located at the centre of communities on Penghu, however, the protected talismans are often located at the edges of settlements. It is related to the function of protection. Residents believe that these religious objects have the power can protect the settlements and drive away bad spirits, as wind is often associated with disease in certain cultural contexts in Penghu culture.

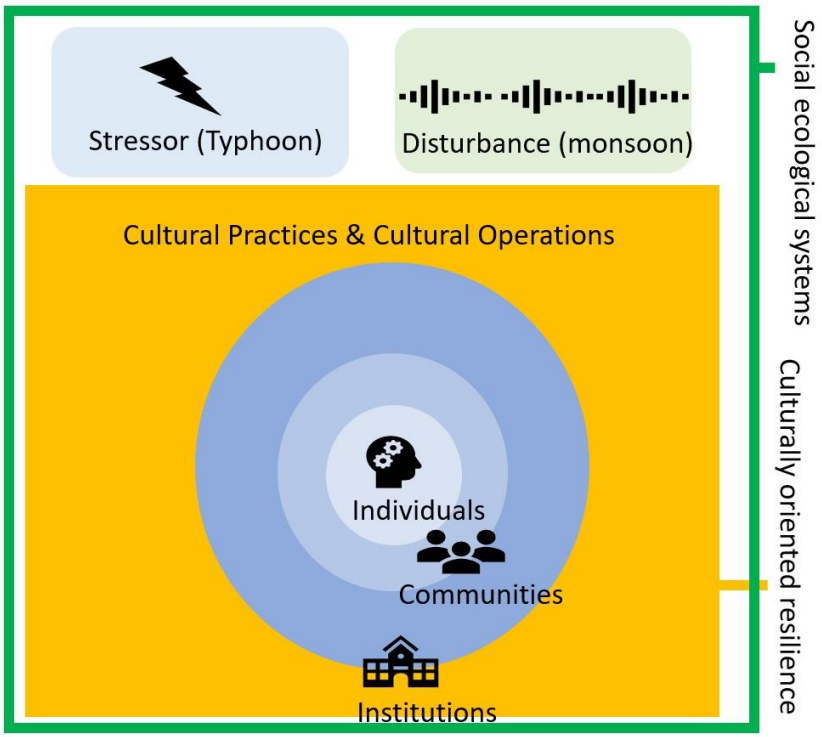


Figure 27 The guarding diagram among agents

Wind resilience in Penghu is demonstrated through various reactions from different agents in the landscape. Private agents focus on architectural elements, orientation, and settlement locations to withstand the wind. Public institutions primarily address wind resilience at the community outskirts and major roads. Additionally, religious beliefs play a mediating role that connects spirit and belief in protecting communities from the wind, with

talismans and religious objects believed to have the power to safeguard settlements and ward off negative influences associated with the wind.

From a functional orientation perspective, the mapping approach provides insights into the different ways in which wind interacts with the landscape. The statistics indicate that out of the 561 objects mapped, the majority of them, i.e., 443 objects, reflect the response to wind, as I depicted above. Additionally, 76 objects reflect the impact of wind in the selected mapping area, such as damage caused by typhoons and strong monsoons. Only 6 objects fall under the category of using wind, and these are represented by the wind turbines located in Huxi Township. Most of the damaged objects are located on the small island, Tongpan, especially broken house roofs and house structures.

Take TongPan for example. There are a total of 369 registered residents in TongPan (Penghu Government, 2017). However, the actual population is less than half of this number. This is because TongPan is only a 15 to 20-minute boat ride away from Magong city, and many residents have relocated there. According to interview data, in the 1990s, TongPan saw an influx of tourists due to the rise of island tourism, and many businesses gathered along the coastline, even constructing a shopping street. However, after promoting tourism in the South Penghu Marine National Park, tourist boats began skipping TongPan and heading directly to other islands in the south. As a result, when tourists stopped visiting the island, many residents also left TongPan, and buildings gradually became abandoned, like forgotten islands. In short, with the decline in tourism to TongPan, many residents have left the area, leading to the abandonment of buildings. Therefore, it is important to consider not only the cultural and historical significance of a place but also its economic sustainability in planning for its future.

This study showed the various agents involved in wind resilience in Penghu, including individuals, communities, and institutions, and their corresponding traces of wind in the landscape. These objects are able to enhance wind resilience. It should be noted that during the fieldwork period, which did not take place during typhoon season, the objects mapped, except for flood height markers installed by the government, were only related to the northeast monsoon winds. Culture plays a crucial role in enhancing wind resilience, as seen in the design and construction of buildings, settlement locations, and religious beliefs. Overall, the mapping approach highlights the importance of cultural values and practices in increasing wind resilience and emphasizes the significance of different agents.

4.4 Cognitive and mental dimension to winds- the result of interviews

After analysing the outcomes derived from the mapping of wind traces with respect to material responses from various agents in the Penghu archipelago, this section redirects its attention to the results of interviews, to observe the narrative and cognitive association of wind from the interviewee approach.

To gain deeper insights into the cultural responses to wind on the Penghu archipelago and its impact on the lifestyle of its residents, a qualitative analysis was conducted. The term "narrative" in this context refers to the interviews conducted by the author in 2020 with experts and in 2022 with community members. The expert interviews primarily focused on how government units manage typhoons and monsoons, while the community interviews aimed to capture perceptions and actions. The detailed objectives of these semi-structured interviews are outlined in the methodology chapter. Four distinct themes were identified to organize and structure the interviews effectively: memory, perception, knowledge, and reactions. Each theme provides valuable insights into the government and community relationship in dealing with wind-related challenges.

It is important to note that when interviewees reference "wind," they refer to the monsoon. Therefore, when the term "wind" is used in the quoted statements, it should be understood to represent the monsoon. To remain faithful to the interviewees' original expressions, the term ''wind'' has been retained in these sentences. There are 34 interviewees in total, 7 expert interviews and 27 community members interviews.

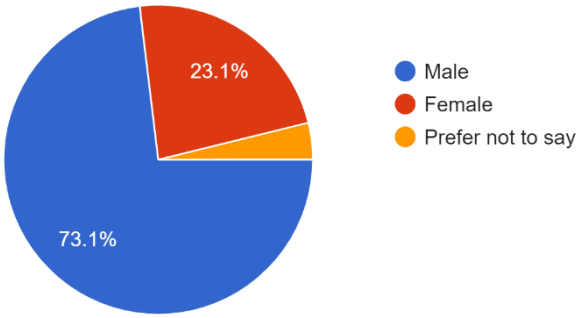


Figure 28 Genders of interviewees (34 interviewees)

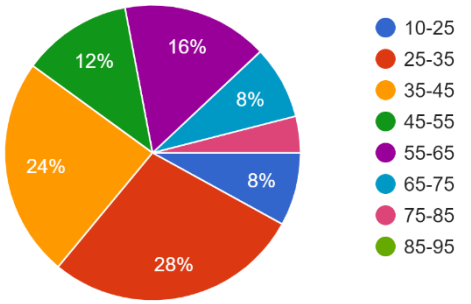


Figure 29 Ages of interviewees (34 interviewees)

The age and sex composition is shown in the pie charts, Figure 28 and Figure 29. Approximately 73% of the interviewees are male, while around 23% are female. Additionally, around 52% of interviewees fall within the 25-45 age range. In general, the selection of interviewees was carefully considered. For example, gender equality was one aspect; I invited an equal number of female and male interviewees. However, I received more rejections from female than male community members, and the experts I could find from institutions were all male. The age distribution is quite varied, as I aimed to cover different age groups. From 10-year-old school students to 90-year-old Penghu citizens are our interviewees.

4.4.1 Memory of winds

The role of memory in the interviews was to elicit personal experiences and historical events related to monsoons and typhoons on Penghu. As Rubin and Berntsen mentioned, memory plays a vital role in the social construction of meaning and identity (Rubin & Berntsen, 2003). Memories can be stored at the individual level, but they can also be shared and transmitted within a collective group, shaping the cultural heritage of a community. Memory is significant because *"learning and remembering information about the world around us enables us to make predictions about the future from our past experiences"* (Gazzaniga, 2014, p. 380).

In the context of our interviews with community members of Penghu, memory played a crucial role in allowing the interviewees to recall specific events and experiences related to monsoons and typhoons that had affected their daily lives. By tapping into the interviewees' memories, this research is able to gain a deeper understanding of wind memories shared by Penghu people: What are the memories of monsoons and typhoons? How do they describe the two winds? And what memories are passed on to the next generation?

Daily experiences of monsoon and typhoon

This section explores the daily experiences of monsoons and typhoons as remembered by Penghu residents. The study examines how Penghu people recall these two types of wind in different scenarios and contexts. As mentioned, wind is often invisible, but its effects are seen and felt through its interaction with other materials, such as sand or sound. These visible memories become a tangible part of people's experiences.

Collective memory 1: Hitting by sand on the road (monsoon)

In the process of the interview, the most frequently mentioned experience was when people were hit by sand on the road. The wind refers to the monsoon, which blows seasonally and brings sand onto the road, hitting the skin, face, and legs of those wearing shorts.

> *"I have a vivid childhood memory of the wind on the road, which has significantly improved now due to better paving. The Northeast Monsoon, characterized by a sharp and forceful gust, felt like a slap or a shotgun to the legs. As far as my recollection goes, the season had not yet changed during that time, although it was close to it. I distinctly remember walking home with my classmates, feeling the impact of the wind on my skin. Perhaps, the change in infrastructure could be a contributing factor to the improvement of the road conditions. Despite the improvements, the memory of being hit by sand like a shotgun remains rooted in the minds of the Penghu people. It is a collective memory of hitting by the wind on the road, I am sure, 100%"(PI020, 12042022).*

> *"I have a lot of memories of being hit by sand. For example, you are on the back seat of a scooter, and you may not be wearing long pants. It hurts to be hit by sand" (PI017, 29032022).*

> *"Speaking of wind, it's really inconvenient during the winter. It's not too bad in Magong city if you ride to the countryside, it's fine. But if you ride a scooter, it's a nightmare for Penghu people. When I was young and walking barefoot on the road, the wind could even push me back a step for every three steps I took. Because I was small and lightweight, and the wind was strong. Walking was difficult in the countryside without any shelter. Especially at that time, we didn't wear shoes, and the ground was covered with small stones and sand. It hurt when the wind blew them onto our feet" (PI022, 09042022).*

This memory was shared by many interviewees and was frequently mentioned. The monsoon brings sand that touches people's skin, and this experience is common among the residents.

From an infrastructure point of view, it should be noted that the situation has improved over the years. The financial resources were limited due to the influence of WWII, which resulted in the gradual implementation of asphalt pavement only after the war (W. Lin, 2006, p. 38). Since 1952, the Penghu government has been paving asphalt roads to replace the cow cart roads.

The process of paving asphalt roads on Penghu logically should have decreased the experience of being hit by sand brought by monsoons. However, with the change of transportation habits, from walking to riding scooters, the speed of moving has increased, and the experience of being hit by sand still persists in general.

Collective memory 2: Spooky howling wind (monsoon)

The sand serves as an anchor for the memory scenario of the monsoon, while the second scenario is associated with sound. The sound of monsoon is the second most frequently described aspect of monsoon memory among interviewees and is mentioned consistently. The following are three examples of when interviewees recall the image of monsoons.

> *"When the wind blows the wires in the early days were all whistling. It sounds like whistling at night, ghostly, spooky and even sparks. Due to dampness and wind, there is a high tendency to leak electricity. Sometimes there is even a small electric box on it that makes noise, boom boom, and explodes! Because the wind is too strong, the wire was shaking" (PI022, 09042022).*

> *"The wind in Penghu in winter is relatively strong due to the air pressure. If the windows in the house are not airtight, there will be like woo woo sound. I think it is the sound of winter. Or, I went for a stroll outside of Magong, and then looked at some old houses. Because the structure of the old house has been loosened, its door will have a crackling sound, which is all produced by the wind, which sounds desolate, even a little scary. Wind is a part of my life, anyway, it is a link in our life, and it is presented in an auditory way" (PI020, 12042022).*

"Strong winds are very troublesome because my dad will restrict me from going out, and if the northeast monsoon is strong at night, I will still hear the sound like shoo shoo shoo when I sleep, it is horrible. Even our windows are airtight" (PI026, female, elementary student, 08042022).

Based on the selected quotes, it can be inferred that monsoon memory is primarily associated with the sensation of sound and that spooky descriptions are often mentioned. The spooky sound of monsoon is closely linked to the building materials used in Penghu. As mentioned in the second quote, the interviewee vividly described the spooky, desolate sound produced by the wooden doors when the monsoon blows. Although the memories associated with monsoons are often negative, the interviewee also acknowledged that monsoon is an integral part of the daily life and identity of Penghu people. Additionally, airtight windows have been identified as another material example that can reduce the noisy sound of monsoon, as mentioned in the second and third quotes. However, despite their airtightness, the sound of monsoon is still audibly present.

In the context of monsoon memory, it is noteworthy that monsoon is often associated with danger. This is exemplified in the third quote, where an elementary student was grounded by her father due to the excessively strong monsoon.

In the second quote provided by Interviewee PI020, the distinction is made between the monsoon experienced inside and outside the city of Magong besides the narrative of spooky sound, indicating a pattern of a high level of sensitivity to monsoon. This highlights a pattern in which Penghu residents possess knowledge of areas where the monsoon is stronger or weaker. Specifically, monsoon is weaker in areas within the city limits due to the buildings providing shelter, whereas monsoon is stronger outside of the city where there is little to no protection from the elements.

The observation is intriguing that Penghu people have a sense of knowing the locations where wind shear may occur, particularly in Magong City, where it may happen between two high buildings. The sudden strong monsoon is dangerous, especially for scooter

riders. Several interviewees mentioned seeing or experiencing how the monsoon wind pushed people to the opposite lane. This sense stems from their experience living on Penghu, riding scooters, or discussing with neighbours. This means that monsoon is a daily topic that everyone needs to experience and tackle.

Moreover, some interviewees mentioned the presence of "strong wind" warning traffic signs set up by the government on the road, which could also serve as indicators of potential wind shear zones. Surprisingly, an interviewee mentioned that other wind warning traffic signs are set up by private individuals. The reason is that on some specific roads, accidents emerge endlessly, and people set up warning signs out of good faith. According to the informant, private individuals have witnessed numerous accidents in this area. Consequently, these signs have been placed here. The Penghu government does not remove them. The extra warning signs are made with a child's playmat. People write ''Be careful, big wind'' on playmats and rope them tightly on traffic light poles. This indicates a tolerant space between the government and private individuals concerning the wind issue. Although the private warning signs are placed in public areas, the government tolerates these signs; these signs do not obstruct anyone but serve as reminders to people.

These observations show that monsoons have an impact and influence the daily life in Penghu. Therefore, people need to develop strategies for navigating their surroundings and distinguish where is more dangerous. Even changing the routes of riding. Additionally, people are proactive and flexible. If the formal warning signs are not enough, they set up extra signs out of good faith.

Through the quotes I cited above, it is clear that the interconnection between perception and memory is evident in the sensory descriptions of monsoon experiences, highlighting the overlapping nature of these cognitive processes. Even though interviewees described their monsoon experiences using sensory language, such as the feeling of monsoon or the sound of spooky monsoon, these descriptions were still categorised under the memory section. This is because these experiences were past events that were being recalled. Notably, the sensory nature of these memories highlights the close interlink between perception and memory, and the degree of overlap that can exist between them.

The passing memory- Typhoon Wayne (1986)

Typhoon Wayne was the most frequently mentioned typhoon memory among the interviewees and is considered the most impactful typhoon to have occurred in the last four decades in Penghu. On the night of August 22, 1986, Typhoon Wayne made landfall in Penghu, breaking the record for the strongest wind speed in the Donggi weather station's history. The wind speed was estimated to be more than level 17 according to the Beaufort Wind Force scale, which corresponds to a wind speed of 61.3 meters per second or greater. Typhoon Wayne (1986) caused the most serious effects according to the historical record from the Penghu government, with a maximum average wind speed of 29.8m/s, and a total amount of rainfall of 227mm. Figure 30 shows the impact of Typhoon Wayne, the wreckage from damaged boats from Magong harbour.

Figure 30 The impacts from Typhoon Wayne, and the wreckage from damaged boats from Magong harbour. Photos credit: Japan Taiwan, Journal of Magong Association.

According to Typhoon Wayne ravaged Penghu, causing the worst typhoon disaster since WWII. Based on the preliminary statistics from the Typhoon Prevention Centre of the Penghu County Police Station, the disaster resulted in one death in the county, five missing persons, and 55 people who were slightly injured. Additionally, 353 houses were completely destroyed and 2,570 were partially destroyed, while more than 1000 ships were either destroyed or sank, causing 700 million NTD lost in total. The typhoon also caused the deaths of 6,400 chickens, 2 cows, and 60 goats, and resulted in approximately 500,000 NTD in losses to aquaculture (Hsu, 2005, p. 61).

There are three discernible patterns in the narrative of the Typhoon Wayne memory. Firstly, the memory of Typhoon Wayne on Penghu is ubiquitous across generations, even for those who did not personally experience it. Secondly, Typhoon Wayne is often invoked as a cautionary example to raise awareness and vigilance towards typhoon events. Thirdly, the people and government of Penghu have learned valuable lessons from the Typhoon Wayne experience and have implemented new safety measures and adaptations. The following quotes serve as illustrative examples:

> *"There was a Typhoon Wayne, which I heard about from my dad and other members of our community. Many boats crashed due to broken ropes and collisions with other boats, some were even washed ashore or sank. Typhoon Wayne occurred before I was born. As a precautionary measure, people often cite this event to highlight the dangers of typhoons and to educate future generations on how to prepare and stay safe. As I mentioned earlier, the first boat to be anchored is always placed closer to the harbour wall. This is because most boats are made of plastic and if they collide with the cement wall, the plastic will break, not the cement. ...As a fisherman, the boat is everything to us" (PI013, male, fisherman, 29032022).*

> *"After Typhoon Wayne, the roof of our old house was blown off. In the past, roofs were made of red bricks, unlike the cement used nowadays. However, I still hope that the traditional red brick and tile style can be preserved, not only for its aesthetic appeal but also as a means of cultural preservation. These ancestral homes are a part of our heritage, and I will do my best to maintain them. Fortunately, my uncle came up with a solution. After the typhoon, We picked an auspicious day to start work on a little tinkering. He added cement to the left and right sides of the roof, which increased its stability while retaining the original red bricks and tiles. I am very pleased with this innovative approach" (PO001, male, local historian, 092020).*

"Do you not know that after Typhoon Wayne, the utility poles began to go underground? You can rarely see utility poles in Penghu now. Otherwise, when the typhoon comes, the utility poles will shake terribly and fall back and crush people to death" (PO002, female, hostel owner, 092020).

During the occurrence of typhoons and northeast monsoons, the utility poles and wires situated along the roadsides become potential hazards for the residents. Taipower Corporation has committed to promoting the underground installation of power supply lines in Penghu to improve safety during typhoons and northeast monsoons. Additionally, the undergrounding of utility poles can contribute to the beautification of Penghu's environment, which is particularly relevant given its status as a popular tourist destination. Until 2011, more than 80% of the Penghu area has reached this goal (Penghu Government, 2018b; Zhen, 2011). Undergrounding utility poles is a costly endeavour, with a price tag 10 to 25 times higher than overhead alternatives, and maintenance concerns persist. Despite this, it is often proposed as a solution. However, undergrounding is not without its issues. The installation and reconstruction of transmission lines will be met with environmental impact assessments and possible protests. In addition, there is greater uncertainty involved in undergrounding, especially during extreme natural disasters (Wang, 2017).

The study reveals that while the memory of Typhoon Wayne has been passed down through generations on Penghu, some details of the disaster have been lost over time. In the course of the research, it was found that although the memory of Typhoon Wayne has been preserved in the community, some of the information and details of the disaster have been forgotten. For example, Beiliao (北寮) informant told me people created a song to describe Typhoon Wayne, singing with a guitar. When I asked for more details, however, the answer I got was*: ''The creators at that time all passed away. I asked people in the community that everyone had an impression, but no one could sing this song'' (PO003, male, committee member in temple, 032022).* While some community members remembered a song created to describe the typhoon Wayne, others acknowledged its existence but could not recall the lyrics. This finding indicates that while the event has been memorialized, some aspects have been lost with time. It is important to document and preserve the cultural heritage of disaster

events to ensure that future generations have accurate and comprehensive knowledge of the past.

4.4.2 Perception of winds

After describing the wind memory above, I can shift to the second topic the perception of winds. First of all, the difference between memory and perception is based on the different processes of cognitive. On the one hand, perception is the component of the sense, and perception is the cognitive process through which the brain organises and interprets sensory information from the environment, allowing us to construct a mental representation of the surrounding world (Gazzaniga, 2014, pp. 162–215). On the other hand, memory is an Memory is the continual process of processing information. The information is encoded, stored, and retrieved from past experiences, allowing individuals to retain and utilize information for the future (Tulving, 2002).

Although perception and memory are distinct processes, they are intricately linked, with perception often being the gateway to encoding new memories. In other words, perception is like the outpost of forming memory.

The differentiation between memory and perception was based on the tense used by the interviewees in this study. In this study, the coding of the interviewee narratives as either memory or perception was determined by the tense used. When the interview partner referred to a scenario in the past, it was classified as memory, whereas when the interview partner used the present tense to describe the situation, it was coded as perception.

In this section, the examples will be focused on two directions: sensory perception and risk perception in relation to winds. On the one hand, the definition of risk perception encompasses individuals' beliefs regarding the potential for harm or the possibility of experiencing a loss. On the other hand, sensory perception is the process by which individuals interpret and make sense of information received from their sensory systems, such as vision, hearing, touch, taste, and smell. *''Sensory perception mediates our interaction with the world.''* (L. A. Harrison et al., 2019, p. 3) These two perspectives provide how people perceive winds as or not as a risk, and how the sensory perception of winds influences Penghu people.

Personality & monsoon

Wind, specifically to the monsoon on Penghu, does not only adjust the lifestyle on the island but also affects the way residents perceive their identities. Many informants expressed the link between the strong monsoon and their personalities, and how the strong monsoon shapes their resilience. ''*The wind more or less affects the personality of Penghu people, that is, you will become more optimistic.'' (PI005, 23032022).* Wind is described as a natural phenomenon that changes people's personalities. This quotation shows monsoon has an influence on the personality of Penghu people, but the degree of impact may vary. The affirmative infers that the monsoon on Penghu has a cultural or psychological significance. The claim implies that the monsoon's effect on the personality of Penghu people is noticeable. In short, this sentence provides insight into their personality, which is associated with nature. It suggests that the environment plays a role in shaping their outlook on life. Interestingly, the monsoon was most of the time described as negative, too strong, not convenient, or even annoying. However, to get along with the wind, Penghu people tend to have an optimistic character to find a balance with it.

Identity & monsoon

Besides optimistic personality, the narrative of comparing Taiwan's main island with Penghu is frequently addressed*. ''I think the wind here is incomparable in Taiwan. The wind in Penghu is the symbol of Penghu. The wind is so strong. We have no way to change the northeast monsoon coming here, so we must find a point where we can coexist with it'' (PI005, 23032022).* The first sentence emphasises the uniqueness of the monsoon in Penghu by comparing it to the winds in other parts of Taiwan. This is the first step to distinguish that Penghu is different from Taiwan by monsoon. The second sentence highlights the monsoon is the symbol of Penghu, which refers to its cultural significance. Coexisting with monsoon means rather than against it, Penghu people have learned to adapt to the monsoon rather than trying to resist or control it. The last sentence implies that they have developed a relationship with the wind that allows residents to coexist with it, even embracing monsoon as a part of their identity.

Overall, these quotes provide insight into the cultural significance of the monsoon on Penghu and how the people of the region have adapted to its unique characteristics. Monsoon is part of life, people are not only optimistic but also develop different responses to coexist with it.

Seasonality & monsoon

It is also noteworthy that monsoon is often perceived as the changing of seasonality. The regular seasonal monsoon indicates the change of seasonality. Some informants expressed the blowing of monsoon reminds them the windy seasons are coming. It is also the time for Penghu to take a rest from tourism. *''The wind regulates our life, and I feel the seasons through the arrival of the wind. You see, the tourism industry in Penghu works for half a year and rests for half a year. It is still because of the wind, but it is also because of the wind that Penghu can take rest'' (PI028, 30092020).* Indeed, the pillar industry on Penghu, which today is tourism, is highly dependent on the summer season. The contrast in tourism between summer and winter on Penghu is quite distinct. The tourism industry on Penghu relies heavily on favourable weather conditions, particularly for water activities along the coastal areas. During the summer, the roads are often crowded with tourists, many of whom are scooter riders. Unfortunately, some tourists do not stick to traffic regulations, resulting in frequent accidents.

However, when the monsoon season begins, there is a sharp decline in tourist visits for two primary reasons. Firstly, most tourists rely on rental scooters for transportation, and monsoon conditions make scooter riding challenging on Penghu. Secondly, Penghu's popularity is largely attributed to its water activities, which lose their appeal during the monsoon season. From a tourism perspective, the tourism industry effectively operates for half of the year. From the residents' perspective, this break provides a respite from the tourist influx. The windy season reduces the tourist crowds and brings a peaceful atmosphere to Penghu.

The following is another quotation about seasonality related to monsoon. *''The wind is actually a part of the life of Penghu. When the wind came, the leaves of Leuca japonica fell off, and it is nothing left, which was a bit desolate. This kind of bleak feeling is the winter in Penghu. At this time, the colour of the earth is brown, which is the main colour of winter, and you will know that winter is coming. The wind brings winter. It is also a time for Penghu people to rest'' (PI020, 12042022).* From observing the landscape to the emotional feeling to the sensory perception of wind, the quotation above shows how the monsoon adjusts the physical world and mental status. The wind turns the leaf colour from green to brown, people perceive wind from sight, and the informant recognizes the winter from the colour changes.

In short, this sentence refers to the insight into the cultural, environmental, and emotional significance of the wind on Penghu, and how it shapes the daily life and rhythms.

Interestingly, the monsoon reminds Penghu to take a rest from the quotations above. Monsoons bring inconvenience on the one hand, meanwhile also give Penghu islands a chance to recover from the overload by tourism in summer. Monsoon indicates the seasonality, the archipelago takes a rest, so islanders do.

The overlooked typhoon

It's noteworthy that typhoons are rarely brought up in the interviews. When not explicitly questioned, people on Penghu tend to associate the term "wind" primarily with monsoons. In some instances, interviewees draw comparisons between these two types of winds. The following two statements help shed light on why typhoons may be overlooked in discussions.

Statement 1: Monsoon is more serious than typhoon

Based on the narrative provided, it becomes evident that the perceptions of wind on Penghu are primarily focused on the monsoon rather than typhoons. Interestingly, when the focus shifts to extreme typhoon events, it's surprising to discover that these extreme events are perceived as less severe than the everyday seasonal monsoons on Penghu. Penghu residents often draw comparisons between these two types of winds. *''Taiwanese are afraid of typhoons, but I think our northeast monsoons are stronger than typhoons. I mean when we talk about wind on Penghu we mainly refer to monsoon. You know, our everyday monsoon is just like a mild typhoon'' (PO007, 2020).*

The statement above reflects the prevailing attitudes towards typhoons and highlights that individuals on Penghu consider seasonal monsoons more seriously than typhoons. As previously discussed in section 4.2, it's apparent that the current wind management efforts primarily prioritise typhoons over monsoons at the governmental level. The government tends to treat extreme typhoon events as more urgent than addressing the long-term impact of monsoons.

Statement 2: Monsoon is not a problem for us

The second statement is indeed intriguing to discuss. *"Monsoon is not a problem for us",* is the most mentioned sentence in the interview. While Penghu residents perceive the monsoon

as a more severe weather pattern than typhoons, they do not categorise it as a problem. This opinion is exemplified in the statement, *"Wind? Wind is our everyday life. It is not a problem at all. We get used to it. If we do not, how do we live on Penghu?" (PO009, 2020).* This statement is the general attitude of Penghu residents towards winds. Monsoons are not considered problematic but rather integrated into daily life. The inconsistency between this statement and the ubiquitous adaptations.

This perception reveals an interesting gap between regarding monsoons as "serious" yet not "problematic". When considering the impact and frequency, a severe typhoon should theoretically pose a greater risk than a seasonal monsoon. Residents experience the seasonal monsoon annually, enduring it for almost half of the year. In contrast, "severe" typhoons make landfall in Penghu approximately once in a generation.

This gap between perception and the frequency of exposure to the monsoon hints at why monsoons are not perceived as problematic. From an outsider's perspective (etic), one might assume that monsoons should be problematic, given the adaptations required to cope with the wind stressor, as observed in the landscape and historical archives. However, from the insider's perspective (emic), residents have become used to monsoons, and these adaptations have been ingrained in Penghu culture for centuries. As a result, monsoons are not seen as problematic but rather as an integral part of Penghu life and culture.

The inconsistency of the perception and adaptation

The annual recurrence of similar monsoon experiences reinforces the memories and perceptions and contributes to the development of a collective cultural identity. Overall, the findings highlight the significant role of monsoon in shaping the lived experiences and cultural identity of Penghu residents. The finding provides insights into how monsoons impact local communities and underscores the importance of understanding the cultural significance of such natural phenomena. In short, the interviews conducted with informants provided valuable insights into the various ways in which they perceive wind, including a few typhoons and many perspectives of monsoons, and how these two types of winds impact their daily lives.

The two statements above highlight the daily practice of adaptation to monsoons, which in turn facilitates people in dealing with typhoons. Penghu is exposed to monsoons on

a daily basis for half a year; hence, all adaptations to these disturbances become internalised as part of daily life. When typhoons approach, the adaptations to strong winds are already in place. The inconsistency between perception and adaptation hints that resilience is built through daily improvements. Resilience accumulates over time, becoming embedded in everyday life and evolving as an integral part of Penghu's culture.

4.4.3 Knowledge of winds

Knowledge is a dynamic and fluid concept that evolves and changes over time. As technology advances, new forms of knowledge emerge, but previous knowledge retains its value. Moreover, different generations may possess varying knowledge due to their unique experiences and exposure to different environments. This is particularly relevant on islands, where local knowledge is shaped by the island's geography, climate, and culture.

Penghu, our case study, is a prime example of how knowledge of wind can change over time. Before the advent of modern weather forecast services, the residents of Penghu relied on their experience and observations of the wind to predict weather conditions. Local knowledge of wind was passed down from generation to generation through proverbs, statistics of historical records on strong windy days in the calendar, and even literature about drifting caused by typhoons (Y.-Y. Chen, 2004). This knowledge was crucial for the safety of fishermen, sailors, and other island inhabitants.

Different professions on Penghu have unique perspectives on wind knowledge, each focusing on specific factors related to monsoons and typhoons. For example, fishermen are particularly sensitive to wind because it can impact their safety at sea. In contrast, noodle makers need to know the wind's direction and intensity to adjust the proportion of ingredients used in making noodles, as humidity and temperature can vary with the wind's direction, as mentioned in the preface of this chapter. Thus, knowledge of wind is critical not only for safety but also for the livelihoods on Penghu.

Wind proverbs

In the following paragraphs, I introduce traditional knowledge related to proverbs about winds on Penghu. Please refer to the collected wind proverbs in Appendix B. These proverbs were gathered from interviews and archives and represent a significant aspect of local

knowledge related to wind on the island. Introducing these proverbs is essential to illustrate how wind knowledge is encapsulated in proverbs and how it has been transmitted, reflecting the dynamic nature of culture and society.

In this study, a total of 41 proverbs were collected. Approximately 20% of the proverbs were obtained from interview data, while 80% were collected from books and literature. Regarding proverbs about wind, several interesting findings were identified. Firstly, the proverbs were divided into three categories: agriculture, fisheries, and the third category, which describes the wind phenomenon. The third category is the largest of the three. These proverbs use various metaphors and similes to describe different aspects of wind, such as its strength, direction, and unpredictability. Some of the proverbs in this category also reflect cultural beliefs and religious associations with winds.

For example, one frequently mentioned proverb is ''Dadao Gong brings wind, Mazu brings rain.'' Similar to the conflicts between gods and goddesses in Greek mythology, there is a comparable tale concerning the gods Dadao Gong and Mazu in Taoist mythology. According to legend, when it's Dadao Gong's birthday, there will be a strong wind. Conversely, when it's Mazu's birthday, there will be rain. These two gods are believed to play pranks on each other during their birthdays due to their couple relationship in Taoist mythology. This mythology reflects the cultural belief that wind and rain are not merely natural phenomena but are attributed to the will of the gods.

Lost knowledge of wind?

Another phenomenon of many younger generations whom I interviewed or talked to not having heard these proverbs, except for younger fishermen, raises concerns about the preservation of traditional knowledge. This can be attributed to two main factors: political and educational environments. The older generation of fishermen passed the knowledge down to younger generations while fishing, resulting in a direct and informal learning process. However, other professions of the younger generation may not be as related to wind as fishing. Moreover, the educational system shifted to Mandarin after WWII, while the traditional proverbs were spoken in Taiwanese. According to the population and housing census statistics by the Executive Yuan in 2020, only 31.7% of people's main communication language is Taiwanese nowadays (ExecutiveYuan, 2020, p. 23). As a result, the younger

generation gradually lost the ability to speak Taiwanese, leading to the loss of the proverbs and the knowledge they represent.

The advancement of technology has also led to a decline in the use of traditional knowledge, such as proverbs, as a reference. Nowadays, fishermen do not solely rely on observing the weather and sea conditions before setting out to sea; they also use multiple weather forecast apps installed on their mobile phones and listen to fishing broadcasts for information. By utilising various sources of information, they can make more informed decisions on whether it is safe to go out to sea on a given day. As a result, the traditional knowledge passed down through generations is gradually being replaced by modern technology.

A fisherman articulated this transformation: *''It will be like this. Because you have to admit, the app is more accurate than the naked eye. Of course, I still rely more or less on experience. But the loss of proverbs is not without reason. Technology is advancing, and we must follow suit'' (PO010, 2022).* This narrative from the fisherman reflects the changing landscape of wind knowledge and the impact of technology on traditional knowledge. While the fisherman acknowledges that experience remains important, he also recognises the advantages of using new meteorological technology, such as weather forecast apps, to make informed decisions about going to sea. This highlights how modern technology has augmented fishermen's wind knowledge regarding adverse weather conditions, aiding in mitigating the risks associated with their livelihoods.

Simultaneously, the fisherman acknowledges, to a certain extent, the loss of proverbs, which were once used to guide and inform decision-making about fishing and weather. This suggests that traditional knowledge is gradually being replaced by modern technology. According to my fieldwork, most young generations are unfamiliar with wind proverbs. However, it is essential to note that the lost proverbs are already recorded, preserving them for future generations and providing insights into cultural beliefs and how wind knowledge has evolved.

4.4.4 Action to winds

In the preceding section, I discussed the topics of memory, perception, and knowledge as they relate to monsoons and typhoons. This section shifts the focus to the actions of winds. It is crucial to distinguish between actions and the visualisation of wind (which like section 4.3 demonstrated). Mapping involves observing how different individuals, communities, and institutions respond to wind, while actions to wind refer to the specific behaviours of agents when they experience winds on Penghu. Some of these actions may not be observable by simply mapping the static landscape.

The method of collecting data on actions to monsoons and typhoons involves conducting interviews and participatory observations. The boundaries of action to wind in this research are defined by the specific actions taken by people on days of particular windy days during the monsoon seasons and the general actions taken during the typhoon approach. Understanding action to wind not only provides insight into the unique ways of life on the island in the face of natural phenomena but also sheds light on the impact of winds on various cultural, economic, and wind management aspects of the island.

Monsoon seasons and the economic benefits

White gold - ''tu-tuo-yu'' (Scomberomorus commerson)

The northeast monsoon season also brings economic benefits to Penghu, which is known for its two types of ''gold'', with wind playing a key role in these economic activities. The first type of gold is the ''white gold'', locally known as the ''tu-tuo-yu'' (Scomberomorus commerson), a type of mackerel with a white belly. According to the statistics, the catch of Scomberomorus commerson can reach 500 metric tons per year (FisheryResearchInstitute, 2023).

That is why it was called white gold. These fish typically migrate to the waters around Penghu during the Lunar New Year period when the price for tu-tuo-yu is high. Many fishing boats brave the rough seas during this time to catch these fish. However, the increased risk of the northeast monsoon season means that boat captains must carefully evaluate whether it is safe to go out to sea based on their vessel size and capacity to handle strong winds and waves.

Indeed, the decision to set boats during the northeast monsoon season involves risk assessment and value choices. Some boat captains have expressed that the wind can create operational challenges, but due to the potentially high financial returns from fishing, they are

willing to take on the risk and venture out to sea. There are two opposing opinions to strong wind from captains:

> *''Do I like winds? How could I like winds, do I want to die?'' Captain (PO011, 2022)*

> *''Of course, we fishermen have experience. Fishermen have to fight with the wind and waves in order to make money. When it's windy, everyone doesn't dare to go out. If I dare to go out, the price will be fine when I come back from the fishing boat''. Captain (PO012, 2022)*

These two quotations elucidate the divergent considerations at play. The decision-making process hinges not only on individual captains' characters but also on factors such as boat size, accumulated experience and the valuation between assessing risks and potential benefits.

By observing the decision-making processes of boat captains in the fishing industry during the monsoon season, I can gain insights not only into their courage but also into their accumulated experiences and knowledge regarding the impact of wind on fishing. This knowledge and experience have been passed down from generation to generation.

Black gold- Seaweed (Porphyra dentata)

The relationship between wind and economic activities extends beyond fishing. Another type of gold on Penghu is also known for its ''black gold'', which refers to the edible seaweed Porphyra dentata due to its black colour. The growth and development of this seaweed rely heavily on the windy conditions, as the strong northeast monsoon winds create optimal wave conditions that wash over the basalt rocks along the coast, providing the seaweed with essential nutrients (Cai et al., 1988). As a result, the strength of the northeast monsoon season is positively correlated with the quality and quantity of seaweed harvests, according to statistics, the artificially cultivated seaweed has an annual output value of more than tens of millions of New Taiwanese Dollars (Y. Liu, 2022). This highlights the importance of wind importance but also supports the livelihoods of local communities on Penghu.

Picking fresh fishes up at the beach - ''wind hit fish''

The third example is about the free fish that the residents can obtain during the cold wave in Penghu, known as ''wind hit fish'' by residents. When a cold wave strikes, the sudden drop in seawater temperature causes fish to freeze and wash ashore with the waves. These fish are

still fresh and can be picked up by Penghu residents on the beach; individuals benefit from the monsoon.

Wind significantly impacts various aspects of Penghu, as summarised above. From fishing and harvesting coastal seaweed to benefiting from the wind-hit fish during the cold wave brought by the monsoon, the economic activities in Penghu are closely tied to the effects of wind.

Monsoon seasons and marine litter

The northeast monsoon brings a lot of marine litter to the windward coasts of Penghu. The government, communities, and educational institutions have developed various measures for marine litter.

Since 2019, the Penghu National Scenic Area Administration and Tourist Bureau has been implementing ''the Salute to the Sea project'', which involves local governments' beach cleaning along the coast. They are responsible for maintaining and patrolling 238 kilometres of coastline in Penghu County. The beach cleaning team is currently the most productive team in maintaining the cleanliness of the coast. According to a participant interviewed, the team works for 20 days per month in two shifts. The team has a daily target for picking up marine litter, regardless of wind or rain. By the end of November 2022, the team had cleaned a total of 1047.904 tons of marine litter, including 515.604 tons of general waste, 478.679 tons of recyclable waste, and 53.621 tons of driftwood, covering a total length of 1320.666 kilometres (Penghu Government, 2023). Figure 31 shows the work of the beach cleaning team.

In terms of community efforts, the Longmen community is the most united. Since taking office in 2018, the head of the Hong in Longmen has established a community volunteer team called ''the Red Ant Millennium Squad'' for coastal cleaning. As most of the volunteers are elderly community members, the combined age of the members is over 1000 years old. The Red Ant Millennium Squad not only picks up marine litter but also transforms the litter brought by the monsoon into products. For example, the fish bouy is turned into a talisman. It combines sustainability with belief on Penghu. These products are sold as unique community souvenirs, generating small-scale profits for the community. The community's involvement in the cleaning process has strengthened the community's cohesion and, to some extent, turned the negative impact of the northeast monsoon into a positive one.

Figure 31 Huxi Township marine litter cleaning team

Apart from government policies and community initiatives, marine litter picking has also been integrated into the curriculum of Heheng Elementary School. Since 2016, the school has focused on picking up marine litter and statistical data on the source of marine litter. *The principal of Heheng Elementary School said: ''The first three numbers are countries, so you can know which country this plastic bottle came from, and you must know which country has the*

most... Yes, most are from China. There are also many local ones in Taiwan. We have also some from Dubai'' (PI002, 31032022). In particular, the packaging of PET bottles has information on the country of origin, which the school uses to teach students about the environmental impact of the monsoon and to promote the concept of reducing plastic use.

One of the challenges is the large amount of human resources required to clean up the litter. The Penghu government has allocated considerable resources Meanwhile, the local communities and educational system are proactive to solve this problem. However, during interviews with Penghu residents, many expressed their concern that the issue of marine litter is so vast that it seems impossible to collect all of it. Thus, some interviewees mentioned that more cooperation with neighbouring countries is needed.

During the interviews, it was also evident that marine litter has brought the community together, creating a sense of unity and collective responsibility towards the environment. Although the issue is daunting, the community's awareness of the problem has increased, leading to an understanding of the importance of reducing waste and managing marine litter.

In conclusion, the government, community, and educational institutions have made efforts to tackle marine litter brought by the monsoon on Penghu. The involvement of various agents has not only maintained the cleanliness of the coast but also strengthened community cohesion and provided educational opportunities about monsoon and environmental awareness for students. However, more work needs to be done to reduce the amount of marine litter in the long term. The cooperation of neighbouring countries and a continued effort to educate and mobilise the community will be necessary to reduce the impact of marine litter on Penghu and preserve the natural environment.

Typhoon preparation

The following paragraphs outline the various measures taken by both individuals, communities and institutions on Penghu before, during, and after typhoons to examine the agents' responses to these extreme events of typhoons.

The government is responsible for managing early warning systems, and information about approaching typhoons is disseminated through various channels, including TV, national radio broadcasts, local newspapers, and social media. Village leaders also play a role in

spreading this critical information via public address systems. Residents rely on government facilities such as hospitals and fire bureaus for assistance during emergencies. The government is also responsible for checking on the elderly and identifying vulnerable community members. The government's role after a typhoon includes supporting the elderly, assisting vulnerable community members, and maintaining public spaces that may have been affected by the disaster. Moreover, since 2019, the Penghu government has established a Disaster Management Office, including the management of typhoons. This establishment is a significant indicator of the importance placed on regional disaster management.

Upon receiving typhoon alerts, individuals primarily focus on agricultural preparations. This includes early harvesting of crops, setting up windproof nets, and covering crops to protect them from impending typhoons. As interviewees mentioned, *''Before the typhoon came, most of our anti-typhoon measures were the same as those in Taiwan, that is, early harvesting. Then set up some windproof nets, cover the crops and so on. But nowadays the climate is more difficult to predict ...''(PO008, 2020).* As typhoons are typically short-lived events on Penghu, most lasting around 24 hours, people don't stockpile food extensively. Instead, they have some canned food and instant noodles at home. Since gas stoves are commonly used for cooking, electricity isn't a primary concern during power outages. After the typhoon has passed, families are responsible for cleaning their properties. In cases where assistance is required, neighbourhood networks come together to provide support.

Regarding community assistance, *''Neighborhood farmers will help each other. It is to help harvest before the typhoon comes'' (PO007, 2020)*. Neighbourhood farmers come together to help each other with pre-typhoon preparations, particularly in the early harvesting of crops. This collaborative effort aims to minimise potential crop losses. Moreover, communities have established voluntary rescue teams funded by the government for disaster and emergency response. These teams play a crucial role in assisting during and after typhoons.

Fishermen secure their boats, ensuring they are tightly fixed before the typhoon arrives (Figure 32). This is essential to prevent damage to their important property during typhoons. One interesting cooperation among fishermen can be seen in the photos below. Fishermen collaborate by securely anchoring their boats jointly in the harbour as a

precautionary measure before a typhoon approaches. This collaborative effort enhances wind resilience against the destructive forces of typhoons.

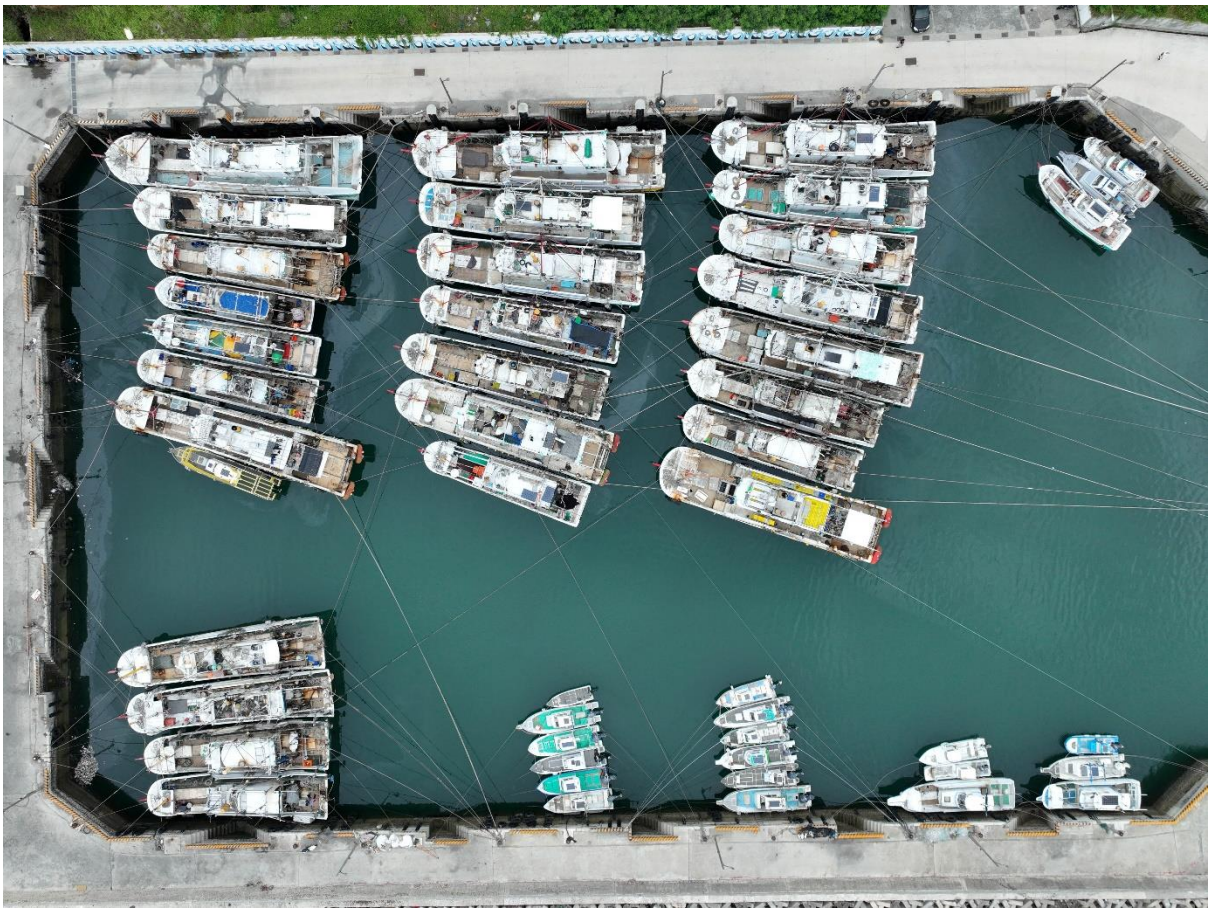


Figure 32 Boats are tight together in the harbor before the typhoon approaches. Photo Credit: Ouxiang Wu

Chapter 5: Discussion

In the settlement of Dongyupingyu on the island, the sunlight bleaches everything. As I looked up from the cliffs, I saw gardens, and below the cliffs, crystal-clear seawater. When I look at the landscape, I am amazed by how resilient Penghu residents are. The direction of settlements, the garden walls, and the repaired patches of something. On the uninhabited island of Xiji, I climbed alongside crabs on the columnar basalt rocks. After reaching the island's plateau, I was met with a cluster of abandoned temples and settlements, all in a state of decay. When you become the sole human presence on the island, hundreds of goat droppings lay underfoot, baked by the sun to resemble hard stones. I ascended a small hill that overlooked the entire island, witnessing the village's constructions. People once worked diligently, stacking windbreak stone walls around the entire island with their manual labour. The stones were heavy, and the walls modest in height, but after the collective village relocation, human activity ceased to progress. All that remained were the goats, the stone houses deteriorating year by year, the washed-up garbage, the unclaimed belongings, and the white bones of goats.

Humans are resilient and fragile. The sea, while often calm, can also be ferocious. Movement between islands relies on small boats, and saltwater-soaked pants cling to the body. Once they dry, salt residues remain, leaving everything white. The island takes on a pale hue, bleached by the relentless sun. The dwindling population also becomes increasingly pale.

Fieldwork diary

The Discussion chapter represents a key aspect of this research endeavour. While the preceding chapter detailed the findings, the Discussion chapter serves as the nexus for explaining the relationships between these findings. It discusses not only the individual roles of the various agents involved but also explores the dynamics of cooperation and disagreement among them.

This chapter is comprised of two critical sections. The first section explains the distinct functions of three agents. The second section represents the heart of this research, focusing on cultural practices and cultural operations. Here, I consolidate the findings and present the cultural importance of resilience.

5.1 Agents' perspectives on wind resilience

In the following paragraphs, I describe the main findings regarding wind responses among institutional, community and individual agents.

5.1.1 Institutional level

At the institutional level, two main wind resilience patterns exist. Firstly, a significant shift in the perception of wind disasters compared to the Japanese colonial period is observed. Through analysis, two key factors contributing to this change are identified: the transformation of industrial structures and advancements in transportation. This reduced the reliance on agriculture and mitigated the impact of wind-induced droughts on food supply by facilitating fresh vegetable transportation from the main island of Taiwan.

Changing perception on wind

Regarding the structure of industry, the wind resilience policies have been changed due to the transformation of economic activities on Penghu. During the 1930s, agriculture dominated the local economy, with over 70% of the population engaged in agricultural practices (Isaburō, 1932). The strong impact of winter monsoons on agricultural productivity posed a significant challenge and was considered part of the disaster category during the Japanese period. However, over time, there was a shift in the economic landscape of Penghu. With the beginning of the passenger ship Tai-Hua Wheel, which facilitated the transportation of vegetables from the main island of Taiwan, the importance of agriculture diminished. The outmigration of the younger population and the ageing of the agricultural workforce further contributed to this decline. As a result, the agricultural share of the economy was reduced to 15.8%.

Another aspect that influences the perception of wind is the trend in disaster prevention with changing policies at the institutional level. The internationalization of disaster research has led to the adoption of systematic disaster management approaches in Taiwan, encompassing response, prevention, preparedness, and mitigation. Taiwan's disaster management efforts commenced in 2000, with Penghu joining the disaster prevention plan in 2014. This policy implementation introduced a top-down disaster response system, where guidelines were disseminated from the central government to local authorities. However, it is worth noting that this top-down approach lacked customization to address individual regions' specific characteristics and needs. For example, while the handbook on autonomous disaster prevention mentions the risk of landslides (Penghu Government, 2021), Penghu's flat terrain makes it unlikely to experience such phenomena compared to the main island of Taiwan. Worth to mention, in terms of wind disaster relief is that the government's approach has shifted from a passive response, primarily providing relief funds, to a proactive governance strategy for disaster management.

Furthermore, Taiwan began implementing policies to foster resilient communities in 2017. Nonetheless, feedback from interviewees indicates more passive participation among community representatives involved in the resilience-building process. Moreover, the general public demonstrates limited awareness of the resilience community policy, with the concept of resilient communities remaining unfamiliar to many interviewees. These observations underscore the need for further consideration and localisation of disaster management policies to ensure their effectiveness and relevance in different regions and communities within Taiwan.

Learning process

Secondly, the trajectory of wind resilience highlights the knowledge dissemination process from local communities to authorities, revealing the continuity and failures of policies across different government regimes. First, the learning process from individual Caizhai to the implementation of large-scale windbreak walls exemplifies how the Japanese empire integrated local cultural practices into their policies. However, the windbreak wall policy was abandoned due to changes in the agricultural industry and the negative perception of local people. However, the windbreak forest policy is continued even after the Japanese period.

5.1.2 Community level

This study identified three dimensions of community-level wind resilience through the mapping of adaptations to wind within the landscape and the insights derived from interview data.

The function of religion

The Japanese government dismantled the Wind God temple, relocating the deity to the Penghu Tianhou Temple. Consequently, the Wind God lost its dedicated temple, yet the belief in wind resilience did not disappear entirely. The system of managing wind through religious practices continued to exist at the community level. For instance, the Five Generals (talisman) functions as a belief in wind resilience.

In the context of this case study, an apparent discrepancy between religious practices and cognitive interpretations is evident, as discussed in Chapter 4.3. The application of etic and emic perspectives aids in comprehending the inconsistencies within wind resilience from a religious standpoint. Traditionally, Penghu people have categorized strong winds as manifestations of evil spirits. However, using talismans is not directly associated with the concept of wind. While religious practices persist, the underlying belief associated with talismans gradually erodes. The younger generation has a decreased understanding of the contextual significance behind talismans, although they still maintain a reverence towards them.

This observation highlights the evolving nature of religious traditions and the potential disconnection between successive generations and the original core ideas. Despite it, talismans serve a multifaceted function, symbolizing not only designated safe areas for habitation but also embodying the cohesion of the community. The shared experiences and collective engagement in the worship of talismans strengthen the bonds among individuals within community, creating a supportive social fabric that aids in building resilience indirectly.

Action to the impact of monsoons

The second dimension located at the community level to deal with wind problems is marine litter. The influx of marine litter during the monsoon season poses a significant challenge along the coastal areas of Penghu. In response to this impact of wind-induced litter, a collaborative effort involving the community, education, and government authorities has been diligently focused on addressing this issue. The Longmen community stands out as a

remarkably cohesive and engaged group within the community. The Red Ant Millennium Squad removes marine litter from the coastline and ingeniously repurposes the debris carried by monsoons, since 2018 - repurposing fish buoys to talismans. This fusion of sustainability and local beliefs contributes to the unique cultural identity of Penghu. These repurposed products are marketed as distinctive community souvenirs, yielding modest profits that bolster the community's financial resources. Beyond financial gains, the active involvement of the community in this clean-up endeavour has reinforced community cohesion and even managed to reshape the negative effects of winter monsoons into a positive force.

Moreover, the effort to address marine litter has extended to Heheng Elementary School's curriculum. It has enabled students to grasp the environmental implications of the monsoon and foster an ethos of minimizing plastic usage. The Penghu government has allocated considerable resources, and local communities and the educational system proactively contribute to solving this issue, even cooperating with each other. Especially, marine litter has paradoxically united the community, instilling a collective responsibility towards the environment.

Community mutual help

The last dimension of community wind resilience is about mutual help during the typhoon period. Typhoon Wayne (1986) stands as a prominent memory among Penghu's inhabitants, representing an important event within the last four decades. With its unprecedented intensity, Typhoon Wayne struck Penghu on August 22, 1986, setting records for wind speed. It left a lasting impact, causing severe destruction, loss of life, and significant damage to properties, boats, and agriculture. Despite its devastating consequences, the memory of Typhoon Wayne has become a shared narrative across generations, serving as a cautionary tale to raise awareness about typhoon preparedness. This collective memory has produced a response, leading to the implementation of safety measures, such as underground power supply lines, to mitigate the risks posed by utility poles during extreme weather. While the memory remains vivid, my research also uncovers the gradual erosion of specific details associated with Typhoon Wayne over time. For example, the song of Wayne is forgotten. Some interviewees mentioned the Wayne song. After typhoon Wayne, community members at Beiliao created a song describing the impact of typhoon Wayne and the loss of property. However, no one remembered the lyrics and the main creators died.

Throughout this research, a recurring theme is mutual help. It was once common among farmers but now diminished due to changes in agricultural practices and demographics. Conversely, the spirit of cooperation still exists among fishermen, evident by collaborative patrols of harbours during and after typhoons, as well as tying boats together to increase resilience to typhoons. This highlights the enduring nature of mutual support within specific occupational communities, reflecting the importance of collective efforts in enhancing wind resilience.

In summary, the examination of community-level wind resilience unveils the persistence of religious practices despite the removal of symbolic wind-related temples by colonial regimes. The community sustains the religious function of wind resilience through the usage of talismans. Nonetheless, the gradual erosion of the original essence of talismans between generations becomes apparent. While the act of worshipping talismans remains, the deep connection between talismans and wind resilience has become obscured. This change suggests a potential decline in the significance of talismans for wind resilience over time.

The influence of wind prompts community engagement, as evidenced by beach cleaning volunteers who repurpose marine litter into cultural and creative products. This proactive initiative by the beach cleaning team also serves to encourage governmental involvement in addressing marine litter concerns. In contemporary times, the government has allocated budgetary resources towards managing marine litter, reflecting a growing concern about this issue. Lastly, the practice of mutual assistance for typhoon preparedness is weakening due to the decline in agriculture. However, among fishermen, the tradition of mutual aid remains, especially in the period before a typhoon approaches.

5.1.3 Individuals level

In addition to the institutional and community levels of wind resilience, the final category of agents contributing to wind resilience are individuals. However, characterizing individuals' contributions is challenging due to the inherent diversity of opinions. Nevertheless, despite this diversity, certain consistent statements and narratives have emerged both from interview records and my participant observation notes.

Perception of monsoon and typhoons

First is the perception of monsoons. Penghu people deny wind (monsoon) is a problem to them. It is important to clarify that Penghu residents' claim that monsoons do not present significant challenges should not be interpreted as that monsoons do not pose a challenge. Employing the mapping methodology, the ubiquity of adaptations to monsoons becomes evident, highlighting a nuanced process of cumulative adaptation across generations. They claim that monsoons do not pose a problem is the result of their many adaptations to this wind phenomenon. These adaptations enable them to live with the consequences of the monsoon disturbances. The cumulative of these adaptations is transgenerational and linked to cultural factors. They represent an evolving and dynamic cultural response that continuously enhances wind resilience over time.

Overlapping adaptations

There are overlapping adaptations to monsoons and typhoons. While typhoons and monsoons are distinct wind systems, the responses to these two types of winds occasionally overlap. For instance, strategies such as stabilizing roofs and securing outdoor property are employed in response to both types of strong winds. Some monsoon adaptations have been used to responses to typhoons.

Nonetheless, it is worth noting that the perception of typhoons and monsoons differs. Interviews clearly reveal a tendency to downplay the significance of typhoons. This can be attributed to the prevailing focus on monsoons, given their consistent and long-term nature. Therefore, Penghu people are trained to be aware of ''wind''. Moreover, statistical data indicates that direct typhoon hits on Penghu are relatively infrequent. Consequently, the extensive experience in dealing with monsoons has fostered a heightened capacity among local inhabitants to effectively manage stressors such as typhoons.

''Wind is our identity''

The last aspect is the influence of long-term monsoons on the identity formation of Penghu's residents. This influence is evident in the interviewees' descriptions of how the arrival of the monsoon season alters the local landscape, triggering a shift in the perceived seasonality. Certain narratives even establish a symbolic connection between the wind and the spirit of Penghu, highlighting the deep-seated cultural and emotional association between the island's identity and monsoons. Individuals' diverse yet consistent responses illustrate the interplay

between culture, experience, and perception, which contribute to Penghu's overall wind resilience.

In short, this comprehensive investigation into wind resilience on Penghu has revealed a multi-faceted adaptation and response related to culture. While institutions, communities, and individuals each play distinct roles, their interactions collectively contribute to the island's ability to navigate the challenges posed by monsoon and typhoon phenomena effectively. In particular, governmental attention is directed towards typhoon preparedness, while individuals invest their efforts in mitigating the challenges posed by monsoons. The community, settling an intermediary position, engages in a dual role. On the one hand, it practices beliefs concerning monsoons with talismans, intertwining cultural and spiritual dimensions with wind resilience. On the other hand, the community collectively prepares for the impact of typhoons, showcasing a collaborative response to extreme wind events.

5.2 Cultural practices of wind resilience

In the following sections, I classify the cultural practices and cultural operations of wind resilience on the Penghu archipelago according to the data I collected. As posited in the theoretical framework, the present analysis employs two notions—cultural practice and cultural operation—in order to understand the role of culture in wind resilience.

My primary findings include a) tracing of the wind resilience trajectory, b) the visualisation of wind adaptations in the landscape, and c) the exploration of mental dimensions related to winds. However, there are still some interrelations between these findings that have not been fully illustrated. Thus, the concepts of cultural practice and cultural operation assume pivotal roles in analyzing discovery, not only to address the role of culture but also with the objective of understanding the interactions among agents that bridge the gaps between methodologies.

The following Table 8 is the cultural practices observed in the Penghu archipelago, categorized according to wind type (monsoons or typhoons), and overlapping adaptations. Table 8 is categorised by the following characteristics: potential wind-induced consequences, the underlying motivations, the adaptations of Penghu people, and the tendency in which the practice was carried out - whether still actively practised, declining, or disappearing. The

agents responsible for the practice are also indicated, and the sources of the data are noted. The table below shows the cultural practice of wind resilience on the Penghu archipelago.

Wind type	Potential consequence	Motivation	Practice	Tendency	Agents	Source
Monsoons	erosion soil	protect soil	Fill soil from the costal area	disappear	individuals	interview
	destroy plants	protect plants	Caizhai	decreasing	individuals	mapping
	bad spirit	protect village	Five Generals	decreasing	community	mapping
	bad spirit	protect village	Shigandang	decreasing	community	mapping
	uncomfortable	save people	Bus stop glasses prevent wind	nowadays	institution	mapping
	destroy plants	protect community and plants	Windbreak wall	decreasing	institution	mapping
	accident	save people	Strong wind warning signal	nowadays	institution	mapping
	accident	save people	Strong wind warning board	nowadays	institution	mapping
	erosion soil	protect soil	Windbreak forest	nowadays	institution	mapping
	broken door	protect property	Doorknob cube	nowadays	individuals	mapping
	lost tree	save plants	Tide up trees to prevent it blown down by the wind	nowadays	individuals	mapping
	lose property	save buildings	Build houses back on wind	nowadays	individuals	mapping
	benefit from wind	use of wind	Wind turbine	nowadays	institution	mapping
	bad spirit	protect village	Pagoda	decreasing	community	mapping
	uncomfortable	prevent being hit by sand	Cover face and head	nowadays	individuals	interview
	accident	believe in protecting boats and life	Wind flag	nowadays	individuals	mapping
	marine litter	protect environment	Beaching cleaning	nowadays	community, institutions	interview
	bad spirit	protect people	Wind god temple	disappear	community	archival research
Monsoons & Typhoons	accident	meteorological observatories	Weather station	nowadays	institution	archival research
	lose property	protect property	Roof reinforcement	nowadays	community	mapping
	lose property	save buildings	House wall	decreasing	individuals	mapping
	broken window	protect property	Double window	nowadays	individuals	mapping
	accident	save people	Literature, proverb	decreasing	community	archival research
	lose property	protect property	Stabling objects	nowadays	individuals	mapping
Typhoons	storm surge	be more awareness	Water level gauge	nowadays	institution	mapping

	storm surge	save people	Evacuation shelter	nowadays	institution	mapping
	destroy plants	save plants	Help neighbours to harvest before typhoons	decreasing	community	archival research
	storm surge	prevent flooding	Build harbour	nowadays	institution	archival research
	lose property	protect property	Fisherman tight boats together	nowadays	individuals	interview
	lose property	be more awareness	Typhoon Wayne song	disappear	community	interview
	prevent disaster	disaster management	Disaster Management Office	nowadays	institution	interview
	accident	protect property	Story tablet about wind	nowadays	community	mapping

Table 8 Cultural practices of wind resilience on the Penghu archipelago

In comparison to typhoons, the quantity of cultural practices related to monsoons are significantly more. Amongst the cultural practices related to monsoons, the majority of motivations behind these practices are related to protection - whether it be the protection of property, the community, or security.

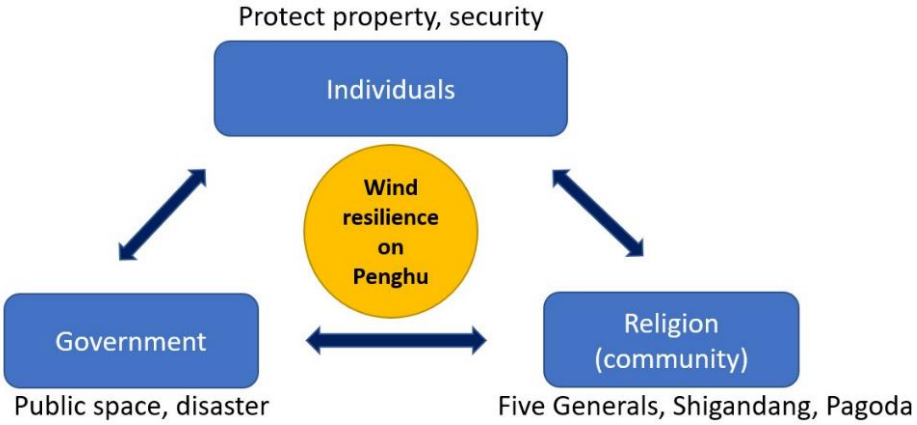


Figure 33 Wind resilience triangle on Penghu

Figure 34 Wind resilience triangle on Penghu

As already shown in the mapping result, it is evident that all agents have their respective roles, demonstrated in Figure 33 Wind resilience triangle on Penghu

Figure 34. First, individuals are responsible for managing their personal and household security, while the community level relies on religious powers to assist in this regard. The government takes charge of public spaces. In other words, the wind resilience of Penghu is formed by a triangle of government, religion, and individuals. The government manages

public spaces and focuses on typhoon disaster management, while the community relies on religious powers such as the Five Generals, Shigandang, and Pagoda to maintain their faith and sense of security. Individuals take personal actions to protect their homes. In summary, every agent plays its own role in facilitating wind resilience, making Penghu wind resilience islands.

However, the religious practices mentioned above, such as the use of talismans, are facing a common problem of declining cultural practices. The younger generation is increasingly disconnected from these practices, leading to a loss of religious belief what these old cultural practices mean. Consequently, the cultural practice triangle may lose one of its essential pillars in the future.

The last finding is the overlapping cultural practices concerning monsoons and typhoons. Everyday responses to monsoons contribute to dealing with typhoons in Penghu. Considering whether responses to monsoons on a daily basis aid in building resilience for extreme typhoon events, the cultural practices above show a positive correlation. The responses to the monsoon are manifold and span from practical, tangible protection measures such as Caizhai to planting forests to spiritual support.

The impact of wind are internalized into everyday life. The quality of resilience is shaped by the response diversity regarding both the number of measures and scope from concrete actions to abstract thinking. Constant exposure to the monsoon helps to incorporate adaptation strategies into cultural acts and even helps people to cope with typhoons.

However, as a result of climate scenario changes, the frequency of strong monsoon days has decreased, and typhoons are becoming more intense. In the long run, the people of Penghu will face increased threats from devastating typhoons.

5.3 Cultural operations of wind resilience

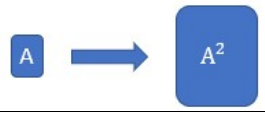
	Monsoon	Definition	Agent	Example
Material	Re-scaling 	Government policy is inspired by local people	Individual and government	Caizhai → Windbreak wall
	Reinterpretation 	Objects have multifunction in order to cope with monsoon	Individual and community	Doorknob
Non-material	Deproblematization 	The perception of monsoons is changed over time. The monsoon is not problematised	Individual and community	Statement: Wind is not a problem for us.
	Internalisation 	People get used to monsoon, monsoon is one part of the identity and life of Penghu people	Individual and community	Statement: The wind is part of my identity.

Table 9 Cultural operations of monsoon resilience on the Penghu archipelago

While cultural practice records specific cultural behaviours at a particular moment in time, cultural operation places emphasis on the temporal perspective and the change of cultural patterns. The main idea behind cultural operations is to observe the general patterns of how cultural practices transform, and thus, ultimately, shape or transform the culture with respect to wind resilience. In short, cultural operations focus on the process of cultural production and transformation, emphasizing its temporal aspect.

	Typhoon	Definition	Agent	Example
Material	Coincidence 	The original purpose is not designed for typhoon resilience	Government	Harbor policy
Non-material	Focus shifting 	Risk perception shifts from cope with monsoon to typhoon	Government	Monsoon → Typhoon
	Organization 	Penghu Government set up a disaster management office to deal with typhoons	Government	Set up Disaster Management Office in 2019

Table 10 Cultural operations of typhoon resilience on the Penghu archipelago

Drawing upon the archival research, the mapping approach and semi-structured interviews, the present study has organized the following Table 9 and Table 10 to shed light on the cultural operations pertaining to the two wind types, monsoons and typhoons. Furthermore, cultural operations can be categorized into material or non-material forms, each of which is assigned a specific name and represented in the schematic diagrams below. In the subsequent section, these operations will be explained in detail.

5.3.1 Material cultural operations

In the context of the previous findings, material cultural operation marks instances where the cultural operation itself is physically manifested in the material realm, which means can be found in the landscape. The empirical findings reveal two distinct examples of material cultural operations that are geared towards enhancing monsoon resilience. Meanwhile, there is one example of material cultural operation pertaining to typhoon resilience.

Monsoons

Regarding the monsoon resilience on Penghu, two cultural operations, namely re-scaling and reinterpretation are observed in the landscape. Re-scaling pertains to the transition from Caizhai, an individual-level garden, to a national-scale wind policy initiated by the Japanese Empire. It is a learning process that the colonial regime's policy is inspired by local people.

Reinterpretation is another cultural operation observed in the landscape, where objects are given multiple functions to cope with monsoon. One such object is the doorknob,

which embodies the cultural identity of the island. The doorknob serves not only as a decorative item but also functions as a protective measure against the monsoon. It has become a ubiquitous household windproof method that people use when leaving their homes for an extended period.

Typhoons

Concerning the cultural operation for enhancing typhoon resilience in the material realm, a noteworthy phenomenon is the failed harbour policy. In the 1980s, the ''one community, one arbour'' policy was put into place with the primary aim of promoting the economic benefits of the fishing industry without explicit consideration of its potential impact on wind resilience. Nevertheless, while the policy ultimately failed to achieve its intended purpose, the harbours constructed have proven to be effective in mitigating flood damage during typhoon landfalls, thus fulfilling an inadvertent function in enhancing typhoon resilience.

5.3.2 Non-material cultural operations

Aligned with the material cultural operations towards wind resilience, another category that merits attention is non-material cultural operations. Non-material cultural operation refers to those cultural operations that facilitate wind resilience but are intangible. Such operations are applied within people's cognition and influence their actions. There are two examples of non-material cultural operations each for monsoons and typhoons.

Monsoons

In the context of monsoons, ''deproblematization'' and internalisation represent two facets of the cognitive dimension. On the one hand, the absence of a problematization regarding monsoons on Penghu can be attributed not only to its frequency but also to the community's adeptness in exploring various effective adaptations to the winds through generations. The diversity of responses has been passed down through the generations, constituting a learning process for coexisting with monsoons. On the other hand, the non-material cultural operation of internalisation highlights how monsoons have become deeply embedded in every aspect of life on Penghu. The interviews with experienced fishermen and noodle makers demonstrate that although they may struggle to articulate how they mitigate the impact of the wind, they possess an intuitive understanding of how to do so. This tacit knowledge results

from years of experience and the intergenerational transmission of wind-related adaptations. Monsoon is not viewed as a problem to be solved, but rather as an integral aspect of daily life on Penghu, influencing everything from livelihoods to social interactions. In the previous chapter, interviewees also expressed the view that the monsoon is the spirit of Penghu, and that Penghu's identity is strongly connected to the monsoon.

Typhoons

In terms of typhoons, the non-material cultural operation is mainly observed in the government rather than among other agents. In the past, the Japanese empire prioritized the construction of windbreak walls to mitigate the impact of monsoons and ensure crop production. However, with shifts in the industrial structure and improved food transportation from Taiwan's main island, monsoons are no longer the primary focus. Instead, the government has shifted its attention to typhoons. I call this operation: Focus shifting.

Since severe typhoons rarely occur on Penghu, typhoons are not in focus of local people. However, the government is taking a different approach. Due to the global trend of improving disaster management (Coppola, 2006), Taiwan's central and local governments have begun to pay more attention to disaster preparation and prevention(Ma & Lin, 2020). Thus, while the Japanese empire focused on monsoons in the past, the focus has shifted to typhoons in recent times.

In response to the shift in focus towards typhoons, various organizations such as the Disaster Management Office have been established on Penghu - I call this cultural operation an organization. In line with the policies of the central government, an Emergency Response Centre will be established when a typhoon reaches a significant level of danger. This centre mobilizes numerous county government units and is able to swiftly respond to potential disasters caused by typhoons.

In conclusion, cultural operations provide a wide lens to examine how Penghu culture fosters wind resilience. It illuminates the underlying cultural patterns, agents involved, and the applicability of such operations to different wind types. Especially, cultural operations underscore the temporal dimension, underscoring how cultural practices are formed among various agents and actors, and are subject to change as a result of perceptual shifts over time.

5.4 The role of culture is to orchestrate wind resilience

After analyzing and classifying the collected data into cultural practices and cultural operations, I found that culture, as a main and even leading factor, orchestrates wind resilience. As defined in section 2.3.2, culture is understood as a set of cultural practices and cultural operations. Through observing cultural practices and cultural operations, which are presented in both material and non-material ways on Penghu. I found when the learning process and adaptations apply, culture plays a stronger role in facilitating wind resilience. On the contrary, when communication is insufficient or memory is lost, the culture acts as an obstacle in enhancing wind resilience.

For example, learning from the former regime's wind policy, such as the implementation of Windbreak forests, demonstrates how culture influences resilience positively. Additionally, cooperation among agents, such as Heheng Elementary School participating in maintaining windbreak forests with the government, further enhances resilience. Conversely, culture can act as an obstacle to enhancing wind resilience. For instance, the implementation of the windbreak wall by the Japanese empire failed due to negative impressions caused by forced labour. Another example is the forgetting of the song of Typhoon Wayne between generations, where culture has a negative impact on wind resilience. This forgetting has led to decreased vigilance for devastating typhoons, thereby reducing wind resilience for future generations.

Chapter 6: Conclusions and Outlook

先民刻苦渡海來，甲天借地，
日頭當中歡喜多，雖然有時風透海湧大，雖然有時會風寒；
風調雨順來保庇，謝天甲地，
民風善良好做伙，阮是海風吹大漢的澎湖人。
阮兜是海洋的故鄉，
澎湖的風，澎湖的風，有咱同款的寄望，
澎湖的風，澎湖的風，天星伴阮大漢。

天人菊花開滿全島嶼，澎湖是海洋的故鄉。

—澎湖頌，鄭智仁，2004

In the past, our ancestors, toiling hard, crossed the sea,
Beseeching the divine for this land to be,
Beneath the sun's warm embrace, the joy we find,
Yet, fierce winds and mighty waves may sometimes remind,
Yet, the chilling wind blowing,
In gentle, harmonious winds and rains divine,
The county is prosperous and the people are at peace.
Grateful to the gods for the shelter they decree.
Thanks to the land our ancestors did borrow from gods,
With hearts so kind, in unity, we stand,
I am a child of Penghu, raised by the blowing wind.
Penghu, the cradle of the ocean,
Winds of Penghu, wind of Penghu,
Where the wind of Penghu, with the same dreams, we embrace,
Winds of Penghu, wind of Penghu,
Stars accompany me to grow.

Like sundance (Gaillardia pluchella) blooming all over the archipelago,
Penghu, is the hometown of the ocean.

—Song of Penghu, Cheng, Chi-Chen, 2004
(English version is translated by author)

At the beginning of this last chapter, I share with readers this soulful Penghu song — a true embodiment of the research's essence. The first time I heard it, I was at Heheng Elementary School. Some students were playing straight flutes, and others were singing along with the

music. I looked through the classroom window, and the monsoon wind stirred up waves. It remains a vivid image in my mind. This is Penghu, wind is Penghu.

While some words defy translation, I have endeavoured to preserve the original magic of the lyrics. The song beautifully illustrates how the wind profoundly impacts Penghu, shaping its environment, spirit, and emotions. Within the verses lie the heart of Penghu—the tales of its immigrant ancestors and their humble acknowledgement that these islands are borrowed from gods and nature. Nature is exalted and praised, while the indomitable spirit and diligence of the Penghu people are described. And, of course, the monsoon, omnipresent on the archipelago, intertwines with the fabric of life, deeply rooted in the essence of the Penghu people.

This chapter provides an overview of the key findings presented in this dissertation, followed by a comprehensive analysis of the conceptual and methodological progress made, as well as the limitations, implications, and prospects of the research. The subsequent sections of this chapter will provide a brief summary of the key findings.

6.1 Key findings

At the core of this investigation lies a fundamental inquiry: What role does culture play in shaping wind resilience on the Penghu archipelago? This study has aimed to answer this question through a multifaceted approach, as explained in previous chapters. I employed multiple methods to address the guiding question 1, "How do distinct agents adapt to wind?". My approach involved a comprehensive analysis of the historical trajectory of wind resilience through archival research. Additionally, I conducted observations to identify visible adaptations to wind within the landscape. I found the responses diversity to wind adaptations. Monsoon adaptations are ingrained in daily practices, forming an integral part of Penghu's cultural identity. In contrast, Typhoons are relatively disregarded due to their infrequent occurrence.

The unexpected finding emerged organically during the research and extends beyond the initial scope of inquiry. Given the fact that two distinct wind phenomena exist on Penghu, monsoons and typhoons, a question arose: Can the adaptations established for one type of wind be effectively employed for the other? The investigation revealed that several adaptations originally designed for monsoons can indeed be applied to typhoon events.

Examples include roof reinforcements and the construction of higher house walls of traditional buildings. While these adaptations were primarily developed to mitigate the impact of monsoons, they also prove useful in the face of typhoons, which bring strong winds.

This observation highlights the notion of culturally oriented resilience in the context of everyday life. It becomes evident that Penghu's culture is deeply intertwined with monsoons, but this cultural embeddedness does not extend to typhoons.

Besides the empirical results presented in Chapter 4, the second key finding addresses the question of "perceptions of winds" and explores the profound relationship between monsoons and the residents of Penghu. To answer this question, interviews played a crucial role in gaining insights into the cognitive associations with the two types of wind experienced on the Penghu archipelago. This question is triggered by the statement, Penghu people claim wind is not a problem for them. The primary reason for their statement that wind is not a problem lies in the nature of monsoons, which persist as a long-term, half-yearly disturbance for Penghu. Empirical results also show that devastating typhoons happen infrequently and, therefore, do not catch the Penghu residents' attention. When Penghu residents refer to "wind," they specifically mean the northeast winter dry monsoon. The statement "Wind is identity and part of island life" is a frequently mentioned theme in interviews, emphasizing how Penghu residents view monsoons as integral to their identity and way of life. Consequently, the idea that "Wind (referring to monsoons) is not a problem," as initially encountered in this research, should not be misinterpreted as monsoons posing no challenges.

To survive and thrive in the strong winter monsoons, Penghu residents have adapted over generations, as evident in the landscape, historical archives, and the everyday thinking of the Penghu people. Monsoons are part of Penghu culture, and residents adapt to monsoons to be resilient. Their accumulation of insights across generations forms a wind culture on Penghu. Mitigating the impact of monsoons is an inherent aspect of Penghu residents' mindset. For instance, Penghu people are well-informed about the locations of strong wind gust intersections, choosing different roads to take during windy days. Wind, specifically monsoons in this context, is deeply intertwined with the identity of Penghu residents.

The constant adaptation to living with the disturbances caused by the monsoon has become ingrained in Penghu people's daily lives, extending its influence to various aspects - including the social, economic, and political domains. This characteristic of the monsoon's influence provides a valuable connection to culturally oriented resilience. The Penghu people's ability to adapt and live with the monsoon's challenges exemplifies the wind resilience that is deeply embedded in their culture. Cultural responses, values, and knowledge acquired over time enable the community to navigate and cope with the challenges posed by monsoons.

The third finding is in relation to the guiding question 3: "*What functions do the distinct agents play in wind resilience?*" Various agents assume distinct functions within the context of wind resilience. Basically, institutions take responsibility for public areas and have now shifted their main focus from monsoon management towards typhoon prevention. In contrast, communities employ the *Five Generals* and *Shigandang* (talismans) as a means to ward off evil spirits associated with the wind, a practice that persists even as the original idea behind it has gradually disappeared among younger generations. Meanwhile, individuals mainly concentrate their efforts on safeguarding their properties, with a particular focus on mitigating property damage caused by monsoons.

While the roles of these agents in enhancing wind resilience are clearly outlined, conflict and disagreement among agents lead to mismatched narratives. These mismatched narratives largely arise from insufficient communication among the various agents. In particular, institutions have implemented policies aimed at enhancing wind resilience without considering the cultural values held by the people of Penghu. For example, the Japanese empire forced people to build windbreak walls to mitigate the impact of monsoons. Those policies eventually failed. However, instances of cooperation between agents also emerge. For instance, the government and Heheng Elementary School have entered into a cooperative agreement to protect windbreak forests, and the Japanese Empire learned from the individual adaptation of "Caizhai," to scale up as the windbreak walls. Windbreak forests are a practice that endures to this day. It shows the current government learned from the former regime and continues this wind policy. In overview, this research concludes that different agents fulfil distinct roles in enhancing wind resilience, leading to both cooperative and conflicting

responses. Culture emerges as a pivotal factor in enhancing wind resilience on the Penghu archipelago.

6.2 Conceptual advances, limitations and outlook

My theoretical contribution starts by pointing out the significant absence of a cultural perspective within resilience research. This research proposes a methodological approach to examining culture's role in fostering culturally oriented resilience. The significance of culture in resilience research is emphasised through a comprehensive analysis of both Eastern and Western viewpoints, reinforcing the clear need for a cultural perspective. After comparing Taiwanese and Chinese resilience research papers, research results show the absence of efforts to bridge the gap between resilience and its localised significance. Culture provides a pivotal yet overlooked dimension within resilience research. Both Taiwanese and Chinese scholars acknowledge the need to adapt the Western concept of resilience to suit local contexts. However, this rarely translates into systematic explorations of the cultural dimension. Despite recognising culture's relevance, very few studies explore the intersection of culture and resilience. Therefore, this research develops a culturally oriented resilience framework to consider the overlooked dimension of culture.

The concepts of disturbances and stressors hold different roles in this research. Disturbances refer to disruptive events or interferences that a system can absorb or cope with without causing significant changes to its functionality, such as monsoons. Stressors are forces or events that can push a system beyond its capacity, resulting in functional disruptions, such as typhoons.

My main research focus is the cultural perspective on wind resilience within the Penghu archipelago by considering two dimensions - the spatial and temporal aspects. Both of which hold significance in drafting the boundaries of the wind resilience system. Additionally, I adopt Cutter's inspiring questions (Cutter, 2016): ''resilience to what?'' and ''resilience for whom?''. These questions guide the classification of distinct agents into three categories: individuals, communities, and institutions - exploring their respective responses to wind resilience. This classification sets the groundwork for comprehensively analysing the varying responses. The next step is to identify intersections and conflicts among agents. This

approach contributes to a comprehensive understanding of the interplay of wind resilience on Penghu, shedding light on the cooperation and conflict between distinct agents.

The main contribution of this research is the two analytical dimensions of cultural practices and cultural operations. These two dimensions can systematically explore the cultural perspective of wind resilience. Cultural practices refer to adaptations with cultural elements by agents to enhance wind resilience. It involves understanding initial responses, adaptations, and the process by which responses are formed. On the other hand, cultural operation focuses on the broader process of cultural production and change related to wind resilience, considering temporal aspects and the links - conjunctions, or disconnects between cultural practices. The difference lies in their scope: cultural practice emphasizes specific adaptations in a certain time, while cultural operation explores the wider cultural dynamics and temporal dimensions of these adaptations.

While the theoretical framework was carefully considered, there are limitations within this research. Especially, the categorisation of agents, particularly institutions, poses a constraint. In the context of this research, the term institution primarily pertains to the government or a school.

In conclusion, this study emphasises the importance of adopting a cultural perspective in resilience research, highlighting the emergence of cultural-oriented resilience as a novel framework. Integrating culture into resilience is logical and feasible, offering applicability to the local conditions within resilience research.

6.3 Methodological advances, limitations and outlook

The central research question of this study focuses on bridging the existing gap in resilience research discussed above, particularly the need to incorporate a cultural perspective. This study proposes a systematic and comprehensive analysis of ''culture'' as a fundamental element in facilitating resilience. Its focus is on cultural responses to environmental stressors and disturbances, specifically the wind phenomenon of typhoons and monsoons. The methodological approaches applied here facilitate the analysis of the role of culture.

Drawing on the Penghu archipelago case study, I employ methodologies that explore the cultural aspects of wind resilience in the landscape, history, and perception dimensions. The cultural perspective on wind resilience is observed through archival research to trace changes in resilience trajectories and through interviews with experts and community members to understand cognitive associations with wind. By considering both material aspects (cultural landscapes and archives) and non-material aspects (cognition and perception), the study provides a comprehensive understanding of cultural responses to wind resilience.

However, this study acknowledges several limitations with the methodology. The first pertains to archival constraints encountered while attempting to analyse the trajectory of wind resilience at the institutional level, especially during the Qing period. In contrast to contemporary records, the lack of available historical data from that era posed challenges to a comprehensive analysis. Moreover, the limitation of archival research is that I can only access records of extreme events, not everyday wind. Therefore, the daily wind aspect is relatively absent in this approach.

Secondly, limitations relating to the temporal and spatial dimensions of the research must be addressed. While the focus of the case study remains on the Penghu archipelago, data collection was mainly concentrated on the Magong main island, excluding certain other areas. Additionally, the study's temporal scope encountered limitations. As mentioned in Chapter 3, the fieldwork period did not overlap with the typhoon season due to the research schedule and plan. A critical point of reflection centres on the researcher's positionality within this study. Despite efforts to differentiate etic and emic viewpoints, the interpretation process retains certain biases that cannot be eliminated. This reflexivity emphasises the need for continuous self-awareness in research works.

The outlook for this research highlights Penghu residents are confronted with the challenge of dealing with increasingly severe typhoons and less intense monsoon days in the context of evolving climate scenarios (M. Xu et al., 2006). This raises concerns about potential future challenges in the event of a catastrophic typhoon occurrence. Additionally, the decrease in monsoon intensity may have other impacts, such as fishermen increasing their fishing days, leading to overfishing. Furthermore, the extension of Penghu's tourist season,

while contributing to economic growth, could also place a greater burden on environmental carrying capacity.

In conclusion, my research bridges the gap that exists in resilience studies by emphasizing the significance of the cultural perspective. Throughout this research, I have been deeply impressed by the resilience of the people of Penghu. Their humble yet practical approach to responding to wind-related challenges is truly amazing. I feel the need to document the cultural responses to wind resilience on Penghu to share it with a wider audience. The residents of Penghu exemplify the cultural importance of resilience in the face of wind challenges.

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Appendix

Appendix A – Interview Guideline

1. Interviewee: Emergency Response Center (ERC)

Introduction

1. How come that you are working here? Since when are you working here?
2. What are your personal duties within ERC? How long have you been working in ERC?
3. It would be important to know the SOP (Standard operation procedure) when a typhoon is approaching/after a typhoon passed by, could you please tell me more beside the general guideline of ERC?
4. Do members in ERC receive regular formations or training besides the usual work for ERC? How frequently it is?

Information

1. In case of storm, what are typical serious situations after a typhoon in Penghu? What is the most serious? How would you characterize them?
2. What is the ERC geographical area of responsibility? How does ERC coordinate Magong and the other small islands of the archipelago?
3. For what kind of damages ERC is responsible?
   - The post-disaster statistical report mentioned that a Pagoda had been ruined by a typhoon, is ERC responsible for all spiritual objects, such as five generals, shigangdang, etc. . . ? Villagers on Huayu island mentioned that if a house is destroyed more than 50% by a typhoon, Penghu government will provide financial subsidy to help with the reconstruction of the house. Could you please explain this? Do you have some details and examples?
4. When we read the preventing-disater report, we found the overlap of duties in different offices, could you please explain in detail the tasks of each office?
5. As we know, Penghu county government have to give a semiannual disaster bulletin to central government, could you explain in detail the content?
6. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
7. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
8. Where from do you receive your information/ storm prediction information and how?
9. Could you share your experience in the ERC, especially for preventing disaster?

Judgement

1. What else do you think the ERC could do in addition to its current tasks in order to better serve the communities?
2. In case of severe storm, do you think that the wind speed is an appropriate definition for setting in place the ERC? Could there be other measures to do this, before or after a storm? Do you think this measure will still be appropriate in the future, considering climate change?
3. What are your experiences in cooperating with different actors with different interests? Have you observed any other change, such as a better cooperation with partners etc. . . ?
4. What do you think about the reaction of central or local actors to the work of the ERC or institutional disaster response?
5. Could you go in detail about which are the changes after ERC establishment in 2011? How Penghu government deal with disasters before?
6. Could you share your experience in the ERC? Is there something that has impressed you?
7. What are your feelings about your work during a disaster in the ERC while your family is at home?
8. We know that climate change becomes a serious issue for every country. What kind of changes do you foresee in the future, especially for Penghu archipelago?

2. Interviewee: Fire Bureau

Introduction

1. How come that you are working here? Since when are you working here?
2. What are your personal duties within Fire Bureau? How long have you been work- ing in the Fire Bureau? Are you personally a member of ERC?
3. It would be important to know the SOP (Standard operation procedure) when a typhoon is approaching/after a typhoon passed by, could you please tell me more about it?
4. Could you please explain the tasks of each group in fire bureau? How many mem- bers will be set in a group when there is an emergency situation? And why this number?
5. Does the Fire Bureau have an instruction manual for disaster prevention? Could you share it with me?

Information

1. In case of storm, what are typical serious situations after a typhoon in Penghu? What is the most serious? How would you characterize them?
2. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
3. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
4. Where from do you receive your information/ storm prediction information and how?
5. Could you tell me how the Fire Bureau organizes the work of other offices when a disaster is happening and has happened??
6. What is fire bureau's experience with cooperating with different actors with differ- ent interests?
   - The Fire Bureau is responsible for the communication system during a disaster, and the government outsourced some parts of this work to Chunghwa telecom, how do you cooperate with this company?
7. How is the training in fire bureau organised? Especially for the typhoon disaster?
8. Have there been changes at the policy/administrative structural level after you started working here? Could you explain these changes?
9. What are reactions of the central or local actors to the fire bureau work or institu- tional disaster response?
10. Could you share your experience in the FB, especially for preventing disaster?

Judgement

1. What do you think about the current division of work of disaster prevention and rescue? Do you see redundancies or overlaps in the work they do? If there is a conflict, what would fire bureau do?
2. Could you share your experience of dealing with typhoon disaster? Is there some- thing that has impressed you?
3. What are your feelings about your work in fire bureau while your family is at home?
4. We know that climate change becomes a serious issue for every country. What kind of changes do you foresee in the future, especially for Penghu archipelago?

3. Interviewee: Agriculture and Fisheries

Introduction

1. How come that you are working here? Since when are you working here?
2. What is personal duties within Agricultural and Fisheries? How long have you worked in Agricultural and Fisheries office? Do you a member of ERC?
3. It would be important to know the SOP (Standard operation procedure) when a typhoon is approaching/after a typhoon passed by, could you please tell me more about this?
4. Could you please explain in detail the tasks of each group in Agricultural and Fish- eries?

Information

1. In case of storm, what are typical serious situations after a typhoon in Penghu? What is the most serious? How would you characterize them?
2. How do you cooperate with other offices?
   - Penghu government, coast guard administration, fisherman's association in Penghu county, Police office, and captains
3. In case of severe storm, if there are many emergency situations, how does Agricul- tural and Fisheries assign work to each group?
   - There is a process of "fishing boats entering the port and crew sheltering plan", could you go in detail about this?
   - In the crew sheltering plan that is mentioned above one only talks about China labours, how does Agricultural and Fisheries arrange the labours beside Chi- nese labours from other countries?
   - Could you tell me more about the "Regulations Governing Agricultural Natu- ral Disaster Rescue"?
4. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
5. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
6. Where from do you receive your information/ storm prediction information and how?
7. What is the training in Agricultural and Fisheries for the typhoon disaster?
8. When is a disaster for the Agricultural and Fisheries, and requiring Agricultural and Fisheries' intervention? Why then?
9. Is monsoon a problem for Agricultural and Fisheries? What is the situation of Mon- soon in Penghu? How do Agricultural and Fisheries deal with the transportation with isolated

islands in the monsoon season?

10. Could you share your experience in the A&F, especially for preventing disaster?

Judgement

1. What is your feeling about your work in Agricultural and Fisheries when typhoon is passing while your family is at home?
2. Could you share your experience of dealing with typhoon/monsoon? Is there something that has left a mark? Why though?
3. Agricultural and Fisheries is in charge of ecological conservation. What do you think about the balance between tourism industry and ecological conservation in Penghu county?
4. We know that climate change becomes a serious issue for every country. What kind of changes do you foresee in the future, especially for Penghu archipelago?

4. Interviewee: Public Healthy Office on Hujing/ Tong- Pan island

Introduction

1. How come that you are working here? Since when are you working here?
2. What are your personal duties within Public Healthy Office? How long have you been working in Public Healthy Office? When has it been set into place on this island?
3. How do you organize the work with other parts of the medicalsystem?
4. Could you please explain in detail what is routine work and disaster-oriented work?

Information

1. In case of storm, what are typical serious situations after a typhoon in Penghu? What is the most serious? How would you characterize them?
2. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
3. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
4. Where from do you receive your information/ storm prediction information and how?
5. Do you have different missions or requirements to be fulfilled when a typhoon passed/is approaching?
6. Do you receive regular formations or training? If yes, how and what? And why that way?
7. How do you get medical equipment and supply with medication from mainisland, and how do the supplies reach the islanders?
8. As we know this island is close to Magong main island, how many percentages of islanders see a doctor in Magong? Or do they prefer to come to Public Health Office? What if Public Health Office has to deal with a situation that is emergency? What do you do and why this way?
9. Are there statistics about the number of cases of illness after typhoons passed? If yes, how are the statistics produced?
10. Could you share your experience in the PHO, especially for preventing disaster?

Judgement

1. Have you observed any other change, such as a better cooperation with partners etc. . . ?

2. What else do you think the Public Healthy Office could do in addition to its current tasks in order to better serve the communities? Do you have any suggestion for the medical system

on isolated island?

3. Could you share your experience in Public Healthy Office? Is there something that has impressed you?
4. What are your feelings about your work during a disaster in the Public Healthy Office while your family is at home even at another island?
5. We know that climate change becomes a serious issue for every country. What kind of changes do you foresee in the future, especially for Penghu archipelago?

5. Interviewee: Community Development Association

Introduction

1. How come that you are joining here? Since when are you joining here?
2. When was CDA put into place? How many members does it have so far? What are your duties within Community Development Association? How long have you been joining in Community Development Association?
3. What are the main goals of Community Development Association, especially in disaster aspect?
4. What are the responsibilities of Community Development Association? Is there a SOP when a typhoon is approaching/after a typhoon passed by?
5. What is the financial framework of Community Development Association?
6. Does your community join the "Resilience community" that government promotes since 2013?

Information

1. In case of storm, what are typical serious situations after a typhoon in Penghu? What is the most serious? How would you characterize them?
2. How does your community organize the work with Penghu government and local groups?
3. Do you receive regular training or take any disaster prevention lecture?
4. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
5. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
6. Where from do you receive your information/ storm prediction information and how? Is there any disaster prevention policy from government?
7. How is the experience that your community worked with other community after a disaster was happened?
8. Could you explain how your community deals with storm disasters? Typhoon and monsoon?

Judgement

1. What else do you think the Community Development Association could do in ad- dition to preventing a disaster?

2. Have there been changes at the policy/structural level since you joined the associ- ation? What are the reasons that make you stay in the Community Development Association?
3. Could you share your experience in the Community Development Association, especially for preventing disaster?
4. What are your feelings about your work during a disaster in the Community Development Association while your family is at home?
5. What are the main challenges you encountered in your work with the community? Is there something that has impressed you?
6. We know that climate change becomes a serious issue for every country. What kind of changes do you foresee in the future, especially for Penghu archipelago?

6. Interviewee: Civilian Rescue Team

Introduction

1. How come that you are joining here? Since when are you joining here?
2. When has it been set into place? How many members does it have?
3. What are your duties within Civilian Rescue Team?
4. What is the financial framework of Civilian Rescue Team?
5. What is the difference between the Civilian Rescue Team and community associa- tion? How many members overlap?
6. Is there a SOP when a typhoon is approaching/after a typhoon passed by?

Information

1. In case of storm, what are typical serious situations after a typhoon in Penghu? What is the most serious? How would you characterize them?
2. How does Civilian Rescue Team know who needs help?
3. How do you communicate with locals or government about a disaster?
4. Are there conflicts between Civilian Rescue Teams while/ after a disaster is happen- ing/was happened? How Civilian Rescue Teams in Penghu county divide responsi- ble areas?
5. What is the reaction of Penghu government or local actors to the work of Civilian Rescue Team?
6. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
7. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
8. Where from do you receive your information/ storm prediction information and how?
9. Could you share your experience in the CRT, especially for preventing disaster?

Judgement

1. Could you go in detail about what are the changes after Civilian Rescue Team was established? What are the reasons that make you stay in this group?
2. What else do you think the Civilian Rescue Team could do in addition to its current actions of preventing a disaster?
3. We know that climate change becomes a serious issue for every country. What kind of changes do you foresee in the future, especially for Penghu archipelago?

7.Interviewee: Magong Meteorological Station

Introduction

1. How come that you are working here? Since when are you working here?
2. What are your personal duties within Magong meteorological station? How long have you been working in Magong meteorological station?
3. Could you introduce how many meteorological station in Penghu, including Un-manned stations?
4. It would be important to know the SOP (Standard operation procedure) when a typhoon is approaching/after a typhoon passed by, could you please tell me more about it?

Information

1. In case of storm, what are typical serious situations after a typhoon in Penghu? What is the most serious? How would you characterize them?
2. In case of severe storm, do you think that the wind speed is an appropriate defini- tion? Could there be other way to measure a disaster?
3. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
4. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
5. Where from do you receive your information/ storm prediction information and how?
6. Does the Magong meteorological station have a instruction manual for disaster pre-vention?
7. What do you consider "severe storm"? At what wind speed do you get active/into emergency?
8. What is a "natural disaster" in Penghu for you? Could you give me some examples or definitions from your experience? Do you have suggestions for preventing storm disaster to Penghu government?
9. Where from do you receive your information/ storm prediction information and how?
10. Do you receive regular training or take any disaster prevention class?
11. How do you communicate with locals or government about a disaster?
12. Have there been changes at the policy/structural level since you started?
13. Could you go in detail about the data that had been collected in Japanese period, the weather data can be accessed from 2005 to nowadays on CWB observation data inquire system. Especially Magong meteorological station is the oldest meteoro- logical station within Taiwan.
14. Could you share your experience in the MMS, especially for preventing disaster?

15. Do you know how locals withstands typhoon disaster? How about monsoon?

Judgement

1. Have you observed any other change, such as a better cooperation with partners etc. . . ?
2. How do you think about the current division of work? Do you see redundancies or overlaps in the work government do? How do you feel about it?
3. What kind of changes do you foresee in the future?
4. Could you share your experience in the Magong meteorological station? Did you change stations in Penghu? Is there something that has impressed you?
5. What are your feelings about your work during a disaster in the Magong meteorological station while your family is at home?
6. We know that climate change becomes a serious issue for every country. What kind of changes do you foresee in the future, especially for Penghu archipelago?

Community Members Interview Guideline

1. If we mention Penghu culture, what is your first association? What springs to you mind first?
2. Is there an object representing Penghu culture? What and why do you choose it?
3. What are the natural disasters in Penghu? Can you describe it?
4. Can you tell about some Penghu culture related to winds?

Perceptions & feelings

1. How many types of wind are there on Penghu?
2. What is your first impression when you close your eyes and think of monsoon and typhoon, what scenario do you see?
3. Can you use a word and a sentence to describe wind (monsoon and typhoon) on Penghu?
4. How do you feel about the northeast monsoon, typhoon?
5. When there are no northeast monsoons and typhoons, is there another wind in Penghu? If so, how can you feel it?
6. Monsoon, typhoon, daily wind, are they female or male? Why?
7. Is wind a topic you are chatting about with your neighbors? Where and how will you discuss it?
8. Did your perception of wind (monsoon and typhoon) change from the past to the present? If so, how?

Wind Knowledge

1. Where do you get the knowledge/information about wind (typhoon and monsoon)?
2. Did you learn something about the wind in school? What is it?
3. How does the information source change from past and now?
4. What are the sayings of landscape change referring to the wind?
5. How do you connotate wind, what is the proverbs or songs related to wind in your mind? Where you hear from it?
6. Is your occupation wind-related, how?
7. How do you deal with wind in your daily space (workplace, home)?
8. How do you make yourself and your property permanently "windproof"? /from Louisa
9. What do you do outside when it's windy? /from Louisa

Response and Impact of wind

1. What is the impact of the northeast monsoon on Penghu: industry, transportation, identity? Etc.
2. Can you describe the impact of typhoons in life aspects?
3. How do you prepare for disasters when a typhoon occurs?
4. When a typhoon is reaching, is there a storage food issue on islands? If so, how is it?
5. When a typhoon is reaching, how will you arrange your pet, animal (like buffalos at the field)
6. When a typhoon is reaching, Do you need help or support for yourself? Who did you ask for it and who did you get it from in the end? Did you help someone? /from Louisa

7. After the typhoon, how can the government help? /from Louisa
8. After the typhoon, how can residents and communities help?
9. What did you learn from the event? /from Louisa

Relation between government and individuals

1. Who should have the responsibility for protecting against storm impacts?
2. Do you remember any public action taken before, during, or after the storm events? If yes, which?
3. How did these public measures affect you as a person? /from Louisa
4. How do you think about the current government policy on winds? Are you satisfied with the way the storm is being handled now? Why?
5. Is there cooperation between the government and the community on storm response? If so, how?
6. Where do you see room for improvement by your side and by the government side?

Memory

1. What are the most impressive typhoons in your experience? Why?
2. How did these experiences change your perception and attitude towards wind?
3. Have you heard about disaster by storm in the history of Penghu? Where have you heard it?

Appendix B– Collected Wind Proverbs

Spoken Language: Taiwanese

Chinese	Month	Calendar	Means	Type of Wind
七月到，展秋風	July	Lunar	If the north wind blows at 2 or 3 o'clock in the afternoon of the seventh lunar month, the north wind will continue until the dawn of the day and then stop. During this period, the fishermen have to rest until it is almost dawn, wait for the wind to stop, and then go out to sea to catch fish.	Monsoon
九月九降風	September	Lunar	If the monsoon blows in September, the wind will be strong.	Monsoon
九月初三，十月初四，嘸風颱嘛有雨意	September October	Lunar	Every year in Penghu, the third day of September and the fourth day of October are usually windy or rainy. The weather phenomenon of a certain day that is usually referred to in the proverb actually includes the days before and after that day.	Not Clear
九月初九，蓋菜栽	September	Lunar	The ninth day of the ninth lunar month is Highness Li's birthday. On that day, there will be a strong north wind, so it has always been regarded as a miracle. But this is also the time when farmers are planting cabbage seedlings, so farmers will be prepared to protect the vegetable seedlings on this day.	Monsoon
二九紙燒秋風彈	February	Lunar	On the 29th day of the seventh lunar month, the northeast monsoon began to blow after the silver paper was burned to send the ghosts.	Monsoon
二八好行舟	Feburary August	Lunar	In February of the Penghu lunar calendar, the northeast monsoon season has just passed, and the typhoon season has not yet arrived. In August,	General wind

			the typhoon season has just passed, and the northeast monsoon has not yet blown. Not only there are a few sudden storms, but these two months are prevalent and stable. Southwesterly and northeasterly winds are the best seasons for sailing.	
二月二九烏狗王	February	Lunar	29th of February is believed a windy day, but it is unknown who is the black dog king.	Monsoon
五、六嘸同八	May, June	Lunar	The south wind should be blowing in the fifth and sixth month of the lunar calendar. If it turns to the north wind, it means that the weather is abnormal, mainly because there may be a typhoon. The northeast wind blows in the fifth and sixth month of the lunar calendar is different from blowing in August.	Typhoon
五月雷陳斷風吼	May	Lunar	Wind roar means strong wind. If there is thunder in May, it means that there will be no strong wind. After the thunderstorms in May, there is no wind, but the rain will keep falling.	Monsoon
八月雷陳白雲飛	August	Lunar	Thunder in August does not bring rain, only a slight north wind blows the white clouds of the sky to the south.	Monsoon
出空犯風東	none	none	Fishing is easy to encounter east wind in early summer, then the squid boat will be blown to China, it is unlucky and cannot catch the squid. It is the fisherman's irony for themselves, which means unlucky	East wind
北風透過暝，抱石壓屋簷	May, June	Lunar	The north wind before the typhoon in May and June of the lunar calendar. Because the wind is too strong, it is necessary to move stones to stabilise the roof tiles to prevent them from flying away.	Typhoon

十二月南風天現報	December	Lunar	An omen. The north wind should blow in December if it is good weather with the south wind. It means the bad weather in the upcoming days.	Change wind direction
十二月南風當面爆（報）	December	Lunar	This sentence means that if the south wind blows in December, there will be a south front immediately, because in winter if there is low pressure in the south and high pressure in the north, the formed front will blow the south wind first, and then the front will start to move south. Rain, and finally back to northerly winds.	Change wind direction
南風轉北，落到沒頭殼	March	Lunar	In the early spring, the south wind blows, and if it suddenly turns to the north wind, there will be downpours, and passersby will not be able to dodge	Change wind direction
嘸風颱就嘸水流柴	none	none	Strong winds and rain will wash the trees to Penghu from the west coast of Taiwan or the east coast of China. In the early period, some people would go to the beach to pick up driftwood and choose the ones that are available to use. Sometimes there are even magical legends about picking up tablets of gods or statues of gods.	Typhoon
四月作北登，行船的伊某貼尻川	April	Lunar	The weather with a north wind blowing during the day and no wind at night, and the crops that bloom at this time, usually in the fourth month of the lunar calendar. At this time, most of the residents of Penghu do not go fishing but carry out the freight business, fishing boats are temporarily used as freighters, transporting goods, earning considerable freight, and fishermen and fishermen's wives will be very happy because of the windfall.	Change wind direction
四月東，五月西，雨那來	April, May	Lunar	The northeast wind blows in April and the southwest wind blows in May, and the rain will continue to fall; the change of wind direction means that the cold air meets the warm air to form a front, so the rain will not stop;	Change wind direction

			as the weather gradually warms, The wind direction also turned from northeast to southwest.	
天公未報，眾神不敢報	none	Lunar	Describe god's prediction of the weather. The ninth day of the Jan. of the lunar calendar is the birthday of the Jade Emperor (the head of the god in Daoism), and if the wind blows on that day, it will be a demonstration for other gods; if there is no wind on the Jade Emperor's birthday, then other gods will not dare to make windy weather on their own birthday.	Prediction
山水敗垵，鎖港敗山	none	none	Legend has it that during the reign of Emperor Qianlong of the Qing Dynasty, there was a big typhoon. Suogang (community name) lost a mountain, the sand was blown to the Shanshui (community name) bay, the bay was filled then it became flat.	Typhoon
拼西南尷就不怕熱	Summer	none	if there is a southwesterly air current in summer, the weather will not be hot, because the southwesterly air current will bring rain or southwesterly wind, which will have a cooling effect.	Southwest wind
新竹風，宜蘭雨，基隆霧港，澎湖風沙	none	none	compared with other cities on Taiwan's main island. Penghu is windy and sandy.	General wind
日報一，暝報七，雞仔啼報十一	none	none	If the northeast monsoon in winter is stronger during the daytime, it means that it will blow a strong wind all day; if the wind strengthens at night, it means that it will be a strong wind for seven days; if the wind strengthens in the early morning, it means that it will blow ten days.	Monsoon

春南夏北，嘸水磨墨	none	none	If the south wind blows in the spring and the north wind blows in the summer, then there is a possibility of drought this year. "No water can grind ink" to describe the severity of the drought.	Change wind direction
春風怕日光	Spring	none	When the sun comes out in spring, the wind stops.	Change wind direction
正月南風三日站	January	Lunar	The south wind blows in the first month of the lunar calendar, which means that there will be three days of good weather.	South wind
海鳥飛上山，破裘著牽幔	none	none	Seeing seabirds flying towards the land means that the wind is so strong that the seabirds dare not stay at sea, and they have to go ashore as soon as possible, and the weather is extremely cold, so even the worn-out clothes should be put on quickly. Keep out the cold.	General wind
澎湖出傻（狂）風	none	none	It means that Penghu is most famous for its violent monsoons in winter.	Monsoon
澎湖風，基隆雨	none	none	Penghu is famous for its strong winds, and Keelung is also famous for its frequent rains.	Monsoon
秋風驚鬼，北風入內	Autumn	Lunar	At the beginning of autumn in the lunar calendar, the wind direction turns to the north wind, which is called the autumn wind; in July and August of the lunar calendar, there may be a north wind of level 5 to 6 during the day, but at night, there is no wind at all, so it is said that the autumn wind will not blow at night for fear of ghosts. !	Monsoon
七月月初一，	July	Lunar	If there is thunder on the first day of the seventh lunar month, there will be many typhoons that year.	Typhoon

一雷九颱來				
七月雷陳風就來	July	Lunar	It means that if there is thunder in July, it will be windy because of a typhoon.	Typhoon
九月颱，嘸人知	September	Lunar	Typhoons in the ninth month of the lunar calendar are relatively easy to change direction before people notice it. Even modern weather forecasts are cautious about them, and long-term experience has shown that typhoons that turn are more severe, such as the Wayne typhoon in 1975, which caused serious disasters.	Typhoon
五、六嘸善北，見北就成颱	May, June	Lunar	In summer, the wind blows from the southwest, but if there is a typhoon coming, the tropical depression in the south rotates counterclockwise, the airflow moves from north to south, and the air pressure in the north is high, which naturally forms the north wind. As soon as the north wind blows in the fifth or sixth month of the lunar calendar, it means that there is a typhoon coming from the south.	Typhoon
八月颱嘸人知，九月颱較厲害	August, September	Lunar	Before the typhoon in May, June and July of the lunar calendar, the wind direction will turn from south to north. However, there is a slight northeast monsoon blowing in the eighth month of the lunar calendar, so there will be no signs before the typhoon comes. In September, due to the stronger northeast monsoon, the typhoon was more powerful and the causes after the typhoon were stronger	Typhoon
六月，一雷接雙颱	June	Lunar	If there is thunder after the beginning of June in the lunar calendar, it means that typhoons will come one after another.	Typhoon
六月初一，一	June	Lunar	If there is thunder on the first day of the sixth lunar month, there will be few typhoons that year.	Typhoon

雷壓九颱				
六月有雷只三颱，七月一雷九颱來	June, July	Lunar	In July, there are many typhoons, and in June less. The north wind in July means that the weather is going to get worse, so it is a sign of a typhoon.	Typhoon
六月雷陳長風哮，七月雷陳割緄走	June, July	Lunar	If there is thunder on the sixth day of the lunar calendar, usually the typhoon will not come, but when there is thunder in July, the typhoon will definitely come.	Typhoon
四月颱嘸人知	April	Lunar	There was no weather forecast in the early days. For rare weather conditions, it was often unpredictable and resulted in heavy casualties. There is always no typhoon in the April of the lunar calendar. If there is an abnormal typhoon at this time, it is hard to predict. Because this month is in the season of spring and summer, and the wind direction is uncertain, even if there is a typhoon and the wind direction changes, it is not easy to be alert, so it is said.	Typhoon
船在灣，人在山	none	none	It means that when the typhoon comes, the ship has been tied up in the port, and the people have returned to the land to take shelter from the wind, so there is no need to worry about everything.	Typhoon

Appendix C – Schematic Diagram of Mapped Objects

Shigandang

Pagoda

Directions of settlement

Wind break wall

Water level gauge

Evacuation shelter

Bus stop

Strong wind warning board

Strong wind Signal

Window

Chaizhai

Door knob cube

Trees

House

Windbreak forest board

Wind turbine

Church

Ancestral Hall

Story Tablet

Wind flag

Five Generals

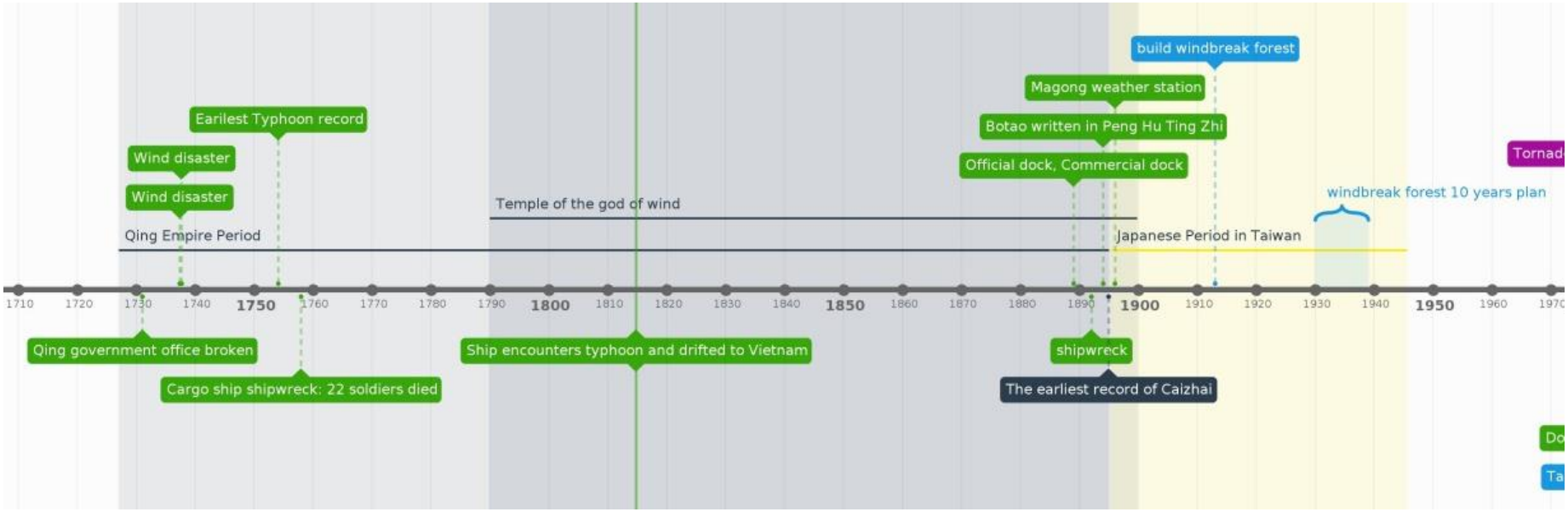
House: pile up with rocks

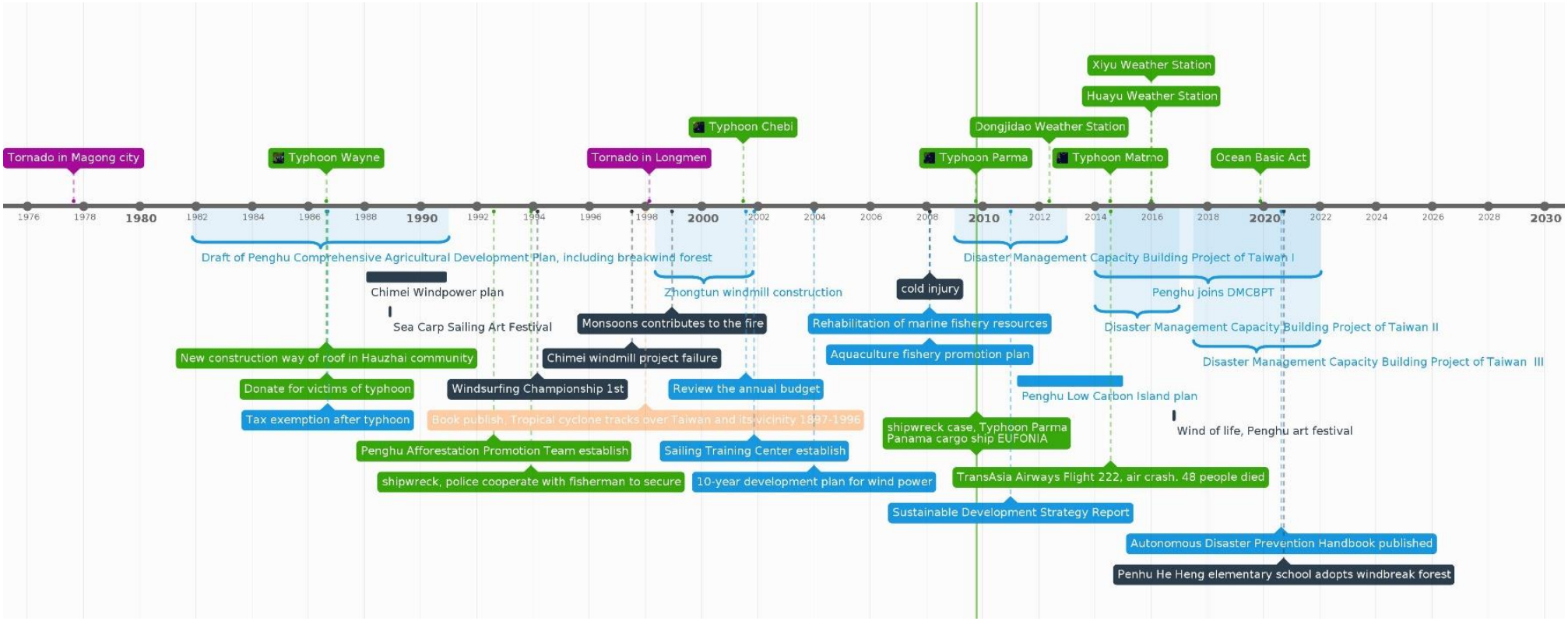
Protection wall

Roof reinforcement

Weight slabs/rosks

Appendix D – Timeline of The Trajectory of Wind Resilience on The Penghu Archipelago




Tornado in Magong city
Typhoon Wayne
Tornado in Longmen
Typhoon Chebi
Typhoon Parma
Typhoon Matmo
Dongjidao Weather Station
Xiyu Weather Station
Huayu Weather Station
Ocean Basic Act
1976
1978
1980
1982
1984
1986
1988
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024
2026
2028
2030
Draft of Penghu Comprehensive Agricultural Development Plan, including breakwind forest
Chimei Windpower plan
Sea Carp Sailing Art Festival
Zhongtun windmill construction
cold injury
Disaster Management Capacity Building Project of Taiwan I
Penghu joins DMCBPT
Disaster Management Capacity Building Project of Taiwan II
Disaster Management Capacity Building Project of Taiwan III
Monsoons contributes to the fire
Rehabilitation of marine fishery resources
Aquaculture fishery promotion plan
New construction way of roof in Hauzhai community
Chimei windmill project failure
Donate for victims of typhoon
Windsurfing Championship 1st
Review the annual budget
Penghu Low Carbon Island plan
Tax exemption after typhoon
Book publish, Tropical cyclone tracks over Taiwan and its vicinity 1897-1996
shipwreck case, Typhoon Parma Panama cargo ship EUFONIA
Wind of life, Penghu art festival
Penghu Afforestation Promotion Team establish
Sailing Training Center establish
shipwreck, police cooperate with fisherman to secure
10-year development plan for wind power
TransAsia Airways Flight 222, air crash. 48 people died
Sustainable Development Strategy Report
Autonomous Disaster Prevention Handbook published
Penhu He Heng elementary school adopts windbreak forest