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OCCASIONAL PAPERS No.65 (November 2025)

**Proceedings of the Twelfth East Asian Island
and Ocean Forum**

Edited by

YAMAMOTO Sota, KAWAI Kei and OTSUKA Yasushi

鹿児島大学国際島嶼教育研究センター

KAGOSHIMA UNIVERSITY

INTERNATIONAL CENTER FOR ISLAND STUDIES

島嶼研

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Preface

The East Asian Island and Ocean Forum (EAIOF) was launched in 2012 by efforts of the Institution for Marine and Island Cultures of Mokpo National University, Korea with cooperative institutes in China, Japan, Korea, and Taiwan.

The first forum was held in Kagoshima (Kagoshima University), Japan in 2013, followed by Shanghai (Shanghai Ocean University), China in 2014, Mokpo (Mokpo National University), Korea in 2015, Keelung (National Taiwan Ocean University), Taiwan in 2016, Matsuyama (Kanagawa University), Japan in 2017, Zhanjiang (Guangdong Ocean University), China in 2018, Busan (Busan National University), Korea in 2019, on-line in 2021 and 2022 (because of COVID-19), Mokpo (Mokpo National University), Korea in 2023, and Keelung (National Taiwan Ocean University), Taiwan in 2024.

In 2025, the International Center for Island Studies, Kagoshima University holds the twelfth EAIOF “Social, Cultural, and Biological Diversity in Small Islands” in Amami Oshima Island, Kagoshima Prefecture, Japan from November 13 to 15, 2025.

The Amami Islands is a region of high social, cultural, and biological diversity that is attracting worldwide attention. In fact, Amami-Oshima, Tokunoshima, northern Okinawajima, and Iriomotejima islands were registered as the World Natural Heritage site on July 26, 2021. On the other hand, socioeconomic and natural environment is changing globally and rapidly, and there is an urgent need to conserve cultural and natural diversity of the Amami Islands and to elucidate mechanisms for maintaining such diversity. We would like to share research outcomes of participants from China, Japan, Korea, and Taiwan and discuss issues on the Amami Islands as well as other islands in East Asia.

In addition, we invited scholars from University of the Philippines Visayas, Philippines, University of Malaysia Sabah, Malaysia, and University of Pattimura, Indonesia because Southeast Asia also has a unique islands’ area called the “Southeast Asian maritime world.” We would like to establish closer relationships and initiate new collaborative researches among institutes of East and Southeast Asia.

We believe it is especially meaningful for researchers whose work focuses on the islands and coastal regions of East and Southeast Asia to gather on Amami-Oshima Island. As the largest island in the Amami Islands, Amami-Oshima Island occupies a

pivotal position in the maritime geography of East Asia. Situated between Kyushu and Okinawa, and facing both the East China Sea and the Pacific Ocean, the island has long served as a cultural and ecological bridge between mainland Japan and the broader Asian region.

Its strategic location places it within historical oceanic networks that have connected Japan, China, Korea, Taiwan, and Southeast Asia through trade, migration, and cultural exchange. Today, Amami-Oshima Island provides a vital lens for examining the intertwined futures of coastal and island communities across Asia. As climate change, biodiversity loss, and cultural erosion increasingly affect the region, Amami-Oshima Island stands as a site of both vulnerability and innovation—where local knowledge and transregional collaboration can converge to address shared concerns.

We hope this forum will lead to enduring scholarly networks that transcend national boundaries and disciplinary silos, and that it will inspire collaborative solutions to the pressing challenges facing maritime communities throughout the region. Amami-Oshima Island, with its profound ecological and historical significance, offers more than just a venue—it provides a living context for reflection, conversation, and collective action. We are profoundly grateful to all participants for contributing their insights and perspectives to this forum.

OTSUKA Yasushi
Director and Professor
International Center for Island Studies
Kagoshima University
JAPAN

November 13, 2025

Program

The Twelfth East Asian Island and Ocean Forum
“Social, Cultural, and Biological Diversity in Small Islands”
November 13 (Thu) - 15 (Sat), 2025

Venue: Amami Station, International Center for Island Studies, Kagoshima University

Address: Naze Minatomachi 15-1, Amami, Kagoshima, 894-0026 JAPAN

Organizer: International Center for Island Studies, Kagoshima University

November 13 (Thursday), 2025

Registration (13:30-14:30)	
14:30-14:40	Opening Remarks <i>HASHIGUCHI Teruto (Executive Director and Vice-President for Research and Information Technology, Kagoshima University)</i>
Keynote Speech	
14:40-15:10	1: The Miraculous Prehistory of the Amami and Okinawa Archipelagos <i>TAKAMIYA Hiroto (Kagoshima University)</i>
Break (15:10-15:30)	
Forum Sessions Start (Presentation: 12 min, Discussion: 3 min)	
Session 1: Biodiversity and Fruit Production in the Amami Islands Moderator: KAWAI Kei (Kagoshima University)	
15:30-15:45	2: Timing of Egg-Sperm Bundles Disintegration: Reproductive Strategies of <i>Acropora</i> Corals <i>KITANOBO Seiya (Kagoshima University) and TAKAMURA Kosuke (Amami Seaside Museum)</i>
15:45-16:00	3: Phenology of Subtropical Trees in Amami Oshima <i>HIEJIMA Shoma and UGAWA Shin (Kagoshima University)</i>
16:00-16:15	4: Control of Black Flies on Small Islands in Kagoshima Prefecture, Japan <i>OTSUKA Yasushi (Kagoshima University)</i>

16:15-16:30	5: Why Did the Japanese Plum ‘Karari’ Originating from Taiwan Take Root in Amami Oshima? <i>KANESHIRO Itoe and KOZAI Naoko (Kagoshima University)</i>
	Session 2: Agriculture in Indonesia Moderator: MUSTA Baba (University of Malaysia Sabah)
16:30-16:45	6: Social Capital, Household Income, and Food Insecurity in Small Islands: Insight from Maluku, Indonesia <i>GIRSANG Wardis (University of Pattimura)</i>
16:45-17:00	7: Species Composition and Characteristics of Agroforestry in Ambon Island, Indonesia: Comparison of Plots at Different Distance from the Village <i>YAMAMOTO Sota (Kagoshima University), HACHISUKA Rico (Kagoshima University), KOMAKI Nobuhiko (Aichi University), KONDO Tomohiro (Kyoto University), UYENO Daisuke (Kagoshima University), SIWALETTE Jeter D. (University of Pattimura) and GIRSANG Wardis (University of Pattimura)</i>
Break (17:00-17:15)	
	Special Session: High School Students’ Presentations Moderator: KITANOBO Seiya (Kagoshima University)
17:15-18:00	Introduction of Amami Oshima Island in English by Students of Oshima High School
Welcome Reception (18:00-20:00)	

November 14 (Friday), 2025

Registration (08:00-09:00)	
	Session 3: Anthropology and Folklore Moderator: TAN Reynold D. (University of the Philippines Visayas)
09:00-09:15	8: Foreign Doctors on Small Islands of Okinawa <i>SENSUI Hidekazu (Kanagawa University)</i>
09:15-09:30	9: Trading Seaweeds: An Anthropological Study of the Gelidiaceae Distribution Network in Taiwan <i>FUJIKAWA Miyoko (Nanzan University)</i>

09:30-09:45	10: A Study on the Draft Amendment to the 台湾漁業規則 (Taiwan Fisheries Regulations) by the 拓殖局 (Colonization Bureau) <i>ARAKAKI Yumeno (Kanagawa University)</i>
09:45-10:00	11: The Wind Lion Belief in Coastal Minnan Society: A Case Study of the Wind Lion Gods in Kinmen <i>WU Chun-Fang (National Taiwan Ocean University)</i>
10:00-10:15	12: The Cultural and Creative Imaginations of Shuitou Settlement in Kinmen <i>WANG Chun-Chang (National Taiwan Ocean University)</i>
10:15-10:30	13: Constructing Island Images: Moving Beyond Isolation and Stigma <i>LEE Gyeong-Ah (Mokpo National University)</i>
Break (10:30-10:50)	
Session 4: History and Literature Moderator: TAKAMIYA Hiroto (Kagoshima University)	
10:50-11:05	14: The Transoceanic Spread of Chinese Celadon Art to the East <i>LI Zhen and LIAO Zhang-Bo (Zhejiang Ocean University)</i>
11:05-11:20	15: The Ancient Tea-Boat Road: An Investigation into the Lineal Cultural Heritage of the Northern Fujian Section <i>ZHENG Liang (Jimei University)</i>
11:20-11:35	16: The Five Cultural Significances of Classical Chinese Maritime Literature <i>WU Chih-Hsiung (National Taiwan Ocean University)</i>
11:35-11:50	17: The Images of Clams in Song Dynasty Culture <i>YAN Jy-Ing (National Taiwan Ocean University)</i>
Lunch (11:50-13:30)	
Session 5: Economy and the “Bridge” Moderator: GIRSANG Wardis (University of Pattimura)	
13:30 -13:45	18: Impact of Trade Openness on Culture: Based on Threshold Effect Caused by Inequality of Income Distribution <i>LIU Yang (Zhejiang Ocean University)</i>

13:45-14:00	<p>19: The Emergence of a “New Dual Economy” in the Settlements of Global Economy-Dependent Island Nations: A Case Study of the Philippines and Fiji</p> <p><i>NISHIMURA Satoru (Tokai University)</i></p>
14:00-14:15	<p>20: Shelling Out Insights: Understanding the Consumer Preferences and Buying Behavior for Oysters (<i>Crassostrea iredalei</i>) in Iloilo City, Philippines</p> <p><i>TAN Reynold D., BALANE, I. B., LACSON, C. J. J., NACIONALES, P. N. S. and RONDUBIO, V. H. S. (University of the Philippines Visayas)</i></p>
14:15-14:30	<p>21: The Long-Term Economic Effects of Bridges: The 60th Anniversary of the Opening of Amakusa Five Bridges</p> <p><i>HAGINO Makoto (Tokai University)</i></p>
14:30-14:45	<p>22: Space and Temporal Changes Following Bridge Connection in Shinan County, Republic of Korea</p> <p><i>KIM Jae-Eun (Mokpo National University)</i></p>
Break (14:45-15:00)	
<p>Session 6: Tourism</p> <p>Moderator: YAMAMOTO Sota (Kagoshima University)</p>	
15:00-15:15	<p>23: In Search of Balanced Governance in Island World Heritage Sites: Amami and Jeju as Case Studies</p> <p><i>SONG Da-Jeong (Wakayama University)</i></p>
15:15-15:30	<p>24: Seafood Cuisine and Island Tourism</p> <p><i>HONG Sun-Kee (Mokpo National University)</i></p>
15:30-15:45	<p>25: Reconstructing the Lost Church of Todos los Santos on Heping Island, Keelung, through Maritime Heritage and AI Visualization</p> <p><i>CHUANG Yu-Li (National Taiwan Ocean University)</i></p>
15:45-16:00	<p>26: Geotourism Potential of Small Island in Semporna Sabah, Malaysia: Integrating Analysis of Volcanic Landscape and Local Cultural Heritage</p> <p><i>MUSTA Baba, ABDULLAH Mohd Harun and SINTANG Suraya (University of Malaysia Sabah)</i></p>

Break (16:00-16:15)	
Session 7: Natural Resources and Conservation Moderator: OTSUKA Yasushi (Kagoshima University)	
16:15-16:30	27: Ecological Resilience and Community-Based Conservation in Island Wetlands: A Case Study of Cingluo Wetland, Penghu, Taiwan <i>YU Shyi-Liang and CHU Ying-Chien (National Penghu University of Science and Technology)</i>
16:30-16:45	28: Community Based Fishery Resource Management and Sustainable Small Island Conservation in Maluku Islands <i>ABRAHAMSZ James (University of Pattimura)</i>
16:45-17:00	29: Sustainable Resource Use in a Fijian Village over the Last 10 Years <i>KAWAI Kei (Kagoshima University), NISHIMURA Satoru (Tokai University), TORII Takashi (Kagoshima University) and OGAWA Ryouichi (Oita University)</i>
Forum Sessions Close	
17:00-17:10	Closing Remarks <i>OTSUKA Yasushi (Director of International Center for Island Studies, Kagoshima University)</i>
General Meeting for the East Asian Island and Ocean Forum (17:10-17:40)	
Break (17:40-18:00)	
Social Gathering (18:00-20:00)	

November 15 (Saturday), 2025

08:45-18:00	Excursion
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Contents

Preface	i
Program	iii
Contents	ix
1) The Miraculous Prehistory of the Amami and Okinawa Archipelagos	1
TAKAMIYA Hiroto (International Center for Island Studies, Kagoshima University)	
2) Timing of Egg-Sperm Bundles Disintegration: Reproductive Strategies of <i>Acropora</i> Corals	3
KITANOBO Seiya ¹ and TAKAMURA Kosuke ² (¹ International Center for Island Studies, Kagoshima University, ² Amami Seaside Museum)	
3) Phenology of Subtropical Trees in Amami Oshima	7
HIEJIMA Shoma and UGAWA Shin (The United Graduate School of Agricultural Sciences, Kagoshima University)	
4) Control of Black Flies on Small Islands in Kagoshima Prefecture, Japan	9
OTSUKA Yasushi (International Center for Island Studies, Kagoshima University)	
5) Why Did the Japanese Plum ‘Karari’ Originating from Taiwan Take Root in Amami Oshima?	11
KANESHIRO Itoe ¹ and KOZAI Naoko ² (¹ Faculty of Law, Economics and Humanities, Kagoshima University, ² Faculty of Agriculture, Kagoshima University)	
6) Social Capital, Household Income, and Food Insecurity in Small Islands: Insight from Maluku, Indonesia	13
GIRSANG Wardis (Faculty of Agriculture, University of Pattimura)	
7) Species Composition and Characteristics of Agroforestry in Ambon Island, Indonesia: Comparison of Plots at Different Distance from the Village	17
YAMAMOTO Sota ¹ , HACHISUKA Rico ² , KOMAKI Nobuhiko ³ , KONDO Tomohiro ⁴ , UYENO Daisuke ⁵ , SIWALETTE Jeter D. ⁶ and GIRSANG Wardis ⁶ (¹ International	

Center for Island Studies, Kagoshima University, ²The United Graduate School of Agricultural Sciences, Kagoshima University, ³Faculty of Regional Policy, Aichi University, ⁴Graduate School of Agriculture, Kyoto University, ⁵Graduate School of Science and Engineering, Kagoshima University, ⁶Faculty of Agriculture, University of Pattimura)

- 8) Foreign Doctors on Small Islands of Okinawa 21
 SENSUI Hidekazu
 (Institute for the Study of Japanese Folk Culture, Kanagawa University)
- 9) Trading Seaweeds: An Anthropological Study of the Gelidiaceae Distribution Network in Taiwan 25
 FUJIKAWA Miyoko (Faculty of Humanities, Nanzan University)
- 10) A Study on the Draft Amendment to the 台湾漁業規則 (Taiwan Fisheries Regulations) by the 拓殖局 (Colonization Bureau) 29
 ARAKAKI Yumeno
 (Cross-Cultural and Japanese Studies Department, Kanagawa University)
- 11) The Wind Lion Belief in Coastal Minnan Society: A Case Study of the Wind Lion Gods in Kinmen 33
 WU Chun-Fang (Institute of Oceanic Culture, National Taiwan Ocean University)
- 12) The Cultural and Creative Imaginations of Shuitou Settlement in Kinmen 37
 WANG Chun-Chang
 (Institute of Oceanic Culture, National Taiwan Ocean University)
- 13) Constructing Island Images: Moving Beyond Isolation and Stigma 41
 LEE Gyeong-Ah
 (Institution for Marine and Island Cultures, Mokpo National University)
- 14) The Transoceanic Spread of Chinese Celadon Art to the East 43
 LI Zhen and LIAO Zhang-Bo (Teachers College, Zhejiang Ocean University)

- 15) The Ancient Tea-Boat Road: An Investigation into the Lineal Cultural Heritage of the Northern Fujian Section 47
ZHENG Liang (College of Marine Culture and Law, Jimei University)
- 16) The Five Cultural Significances of Classical Chinese Maritime Literature 49
WU Chih-Hsiung
(General Education Center, National Taiwan Ocean University)
- 17) The Images of Clams in Song Dynasty Culture 53
YAN Jy-Ing (General Education Center, National Taiwan Ocean University)
- 18) Impact of Trade Openness on Culture: Based on Threshold Effect Caused by Inequality of Income Distribution 57
LIU Yang (Teachers College, Zhejiang Ocean University)
- 19) The Emergence of a “New Dual Economy” in the Settlements of Global Economy-Dependent Island Nations: A Case Study of the Philippines and Fiji . . . 61
NISHIMURA Satoru (School of Humanities and Science, Tokai University)
- 20) Shelling Out Insights: Understanding the Consumer Preferences and Buying Behavior for Oysters (*Crassostrea iredalei*) in Iloilo City, Philippines 65
TAN Reynold D.^{1,2}, BALANE Isobel B.², LACSON Carsy Jaeny J.², NACIONALES Patricia Nicole S.² and RONDUBIO Van Hyancinth S.² (¹College of Management, University of the Philippines Visayas, ²Technology Transfer and Business Development Office, University of the Philippines Visayas)
- 21) The Long-Term Economic Effects of Bridges: The 60th Anniversary of the Opening of Amakusa Five Bridges 69
HAGINO Makoto (School of Humanities and Science, Tokai University)
- 22) Space and Temporal Changes Following Bridge Connection in Shinan County, Republic of Korea 73
KIM Jae-Eun
(Institution for Marine and Island Cultures, Mokpo National University)

- 23) In Search of Balanced Governance in Island World Heritage Sites: Amami and Jeju as Case Studies 77
SONG Da-Jeong (Faculty of Tourism, Wakayama University)
- 24) Seafood Cuisine and Island Tourism 81
HONG Sun-Kee
(Institution for Marine and Island Cultures, Mokpo National University)
- 25) Reconstructing the Lost Church of Todos los Santos on Heping Island, Keelung, through Maritime Heritage and AI Visualization 85
CHUANG Yu-Li
(Oceanic Cultural Creative Design Industries, National Taiwan Ocean University)
- 26) Geotourism Potential of Small Island in Semporna Sabah, Malaysia: Integrating Analysis of Volcanic Landscape and Local Cultural Heritage 89
MUSTA Baba¹, ABDULLAH Mohd Harun¹ and SINTANG Suraya² (¹Small Island Research Centre, Faculty of Science and Technology, University of Malaysia Sabah, ²Centre for Promotion of Knowledge and Language, University of Malaysia Sabah)
- 27) Ecological Resilience and Community-Based Conservation in Island Wetlands: A Case Study of Cingluo Wetland, Penghu, Taiwan 93
YU Shyi-Liang and CHU Ying-Chien (Department of Tourism and Leisure, National Penghu University of Science and Technology)
- 28) Community Based Fishery Resource Management and Sustainable Small Island Conservation in Maluku Islands 97
ABRAHAMSZ James
(Learning Development and Quality Insurance, University of Pattimura)
- 29) Sustainable Resource Use in a Fijian Village over the Last 10 Years 99
KAWAI Kei¹, NISHIMURA Satoru², TORII Takashi³ and OGAWA Ryouichi⁴
(¹International Center for Island Studies, Kagoshima University, ²School of Humanities and Science, Tokai University, ³Faculty of Fisheries, Kagoshima University, ⁴Center for Innovation and Partnership, Oita University)

The Miraculous Prehistory of the Amami and Okinawa Archipelagos

TAKAMIYA Hiroto

International Center for Island Studies, Kagoshima University

Abstract

The terms “miraculous” or “miracle” do not typically apply when explaining scientific phenomena. However, the prehistoric cultural phenomena of the Amami and Okinawa archipelagos, located at the heart of the Ryukyu Islands, can best be described as extraordinary or even miraculous in nature. Prehistory generally refers to the period before written records, and more specifically, it denotes a time span during which people existed without documented history. In the case of the Amami and Okinawa archipelagos, prehistory spans approximately from 30,000 years ago to 1,000 years ago. It is divided into three main periods: the Paleolithic (around 30,000 to 10,000 years ago), the Shellmidden period (around 7,000 to 900 years ago), and the Gusuku period (900 to 500 years ago). Recent archaeological and anthropological research in these regions has uncovered several cultural phenomena that are unparalleled in the context of island archaeology worldwide.

Keywords: Amami and Okinawa archipelagos, human occupation, island archaeology, prehistory

The terms “miraculous” or “miracle” do not typically apply when explaining scientific phenomena. However, the prehistoric cultural phenomena of the Amami and Okinawa archipelagos, located at the center of the Ryukyu archipelago, can be best described as extraordinary or even miraculous. Here I would like to introduce these cultural phenomena.

The Ryukyu archipelago is situated between Kyushu to the north and Taiwan to the south, stretching approximately 1,200 km. The archipelago is geographically divided into three regions: the Northern Ryukyu (Yaku and Tane and their surrounding islands), the Central Ryukyu (Amami and Okinawa archipelagos), and the Southern Ryukyus (the Sakishima Islands). The largest island in the archipelago is Okinawa, with an area of approximately 1,200 km², followed by Amami, which covers about 730 km². The environment is subtropical, and most islands in this region are surrounded by coral reefs.

This presentation focuses on the Central Ryukyus, where *Homo sapiens* appeared around 30,000 years ago. The region’s prehistory consists of three major periods: the Paleolithic (approximately 30,000 to 10,000 years ago), the Shellmidden (approximately 7,000 to 900 years ago), and the Gusuku (approximately 900 to 500 years ago).

Recent archaeological and anthropological studies have revealed several prehistoric cultural phenomena that are unparalleled in the context of island archaeology worldwide. Firstly, as mentioned above, the prehistory of the Amami and Okinawa archipelagos begins with the Paleolithic period. In the Amami archipelago, five Paleolithic sites have been identified, while in Okinawa, eight Paleolithic sites have been found. Additionally, Paleolithic sites have also been discovered on Tanegashima to the north, and Miyako and Ishigaki to the south. The existence of Paleolithic peoples in these island environments is an exceptionally rare phenomenon in the context of island archaeology worldwide.

Secondly, most islands worldwide were first successfully colonized by agriculturalists. Thus, it is stated that island colonization is not possible without agriculture. However, the islands of Amami and Okinawa were settled by hunter-gatherers for several thousand years if not more. Furthermore, although they were aware of Yayoi agriculture, they did not adopt farming practices until approximately 1,000 years ago. The presence of hunter-gatherers on islands like Amami and Okinawa is an extremely rare occurrence.

Thirdly, these islands experienced a transition in subsistence economy from hunting and gathering to agriculture. While most islands worldwide were initially colonized by agriculturalists, these islands did not experience periods of hunter-gatherers. Although only a few islands in the world were settled by hunter-gatherers, their subsistence economy remained hunting and gathering, with no evidence of an agricultural period. The transition from hunting and gathering to agriculture is one of the most significant themes in archaeology and anthropology. The fact that this shift occurred within an island context highlights the unique cultural and environmental significance of the Amami and Okinawa archipelagos.

Lastly, it is often stated that island environments are extremely fragile, especially after the colonization by *Homo sapiens*. Archaeological and anthropological research on many islands around the world demonstrates that once *Homo sapiens* successfully colonize an island, environmental destruction and/or deterioration tend to be triggered. Island archaeologists frequently equate successful colonization by *Homo sapiens* with the beginning of environmental destruction and deterioration. Since the early 1990s, we have examined prehistoric environmental destruction and deterioration in the Amami and Okinawa archipelagos. However, we have not succeeded in pinpointing human-induced environmental destruction or deterioration during prehistoric times. This is an extremely unexpected and remarkable cultural phenomenon within the context of island archaeology.

Timing of Egg-Sperm Bundles Disintegration: Reproductive Strategies of *Acropora* Corals

KITANOBO Seiya¹ and TAKAMURA Kosuke²

1: International Center for Island Studies, Kagoshima University

2: Amami Seaside Museum

Abstract

Coral *Acropora* are hermaphrodites that release egg-sperm capsules called “bundle” during synchronized spawning. These egg-sperm bundles normally float to the sea surface and break apart, allowing eggs and sperm to mix with those from other colonies, leading to external fertilization. In this study, we investigated *Acropora* corals at reef site in Amami Oshima Island, Japan, with different environmental conditions such as wave exposure. We found that the speed at which egg-sperm bundles disintegrate varies by species and may be influenced by local oceanographic factors. These differences suggest that corals can adjust their reproductive strategy by controlling bundle disintegration timing, potentially enhancing fertilization success and supporting genetic diversity in different habitats. This flexibility may be a key factor in how corals adapt to changing marine environments.

Keywords: Amami Oshima Island, coral, egg-sperm bundle, reproduction, reproductive strategy

Coral reefs are one of the most biodiverse and productive ecosystems on Earth, supporting a wide range of marine life and coastal communities (KNOWLTON et al. 2010; Fig. 1). Despite their ecological and economic importance, reef ecosystems are increasingly threatened by climate change, pollution, and coastal development (HUGHES et al. 2018). Understanding the reproduction of reef-building corals is essential for assessing their capacity to recover from disturbances and maintain genetic diversity (ANTHONY et al. 2008).

Among corals, species in the genus *Acropora* are particularly important as fast-growing reef architects. These corals reproduce primarily through multi-species synchronous spawning events that occur once a year, typically around the full moon in spring or summer (BAIRD et al. 2009). *Acropora* species are hermaphroditic, meaning each colony produces both eggs and sperm simultaneously (HARRISON and WALLACE 1990). During spawning, colonies release gametes in the form of buoyant “bundles” that contain both eggs and sperm (Fig. 2). These egg-sperm bundles float to the surface and eventually disintegrate, allowing the gametes from multiple colonies to mix and fertilize externally in the water column (LEVITAN et al. 2004). Successful fertilization depends heavily on precise timing, colony proximity, water movement, and gamete dispersal dynamics (OLIVER and BABCOCK 1992).



Fig. 1. Coral reef of Amami Oshima Island, southern Japan. These ecosystems are largely built and maintained by reef-building corals such as *Acropora*, which provide the structural foundation for marine biodiversity.

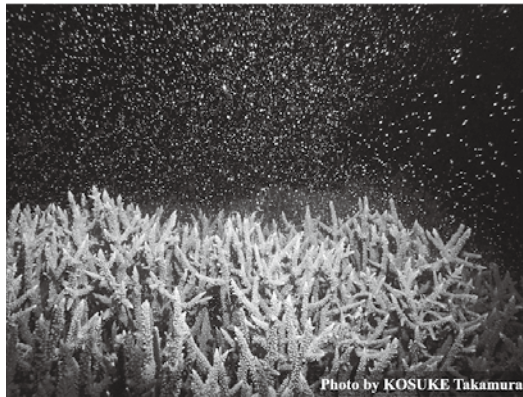


Fig. 2. Spawning of *Acropora* coral in the field. A colony releases pink egg-sperm bundles that rise to the surface. These buoyant egg-sperm bundles are crucial for synchronizing external fertilization among nearby colonies.

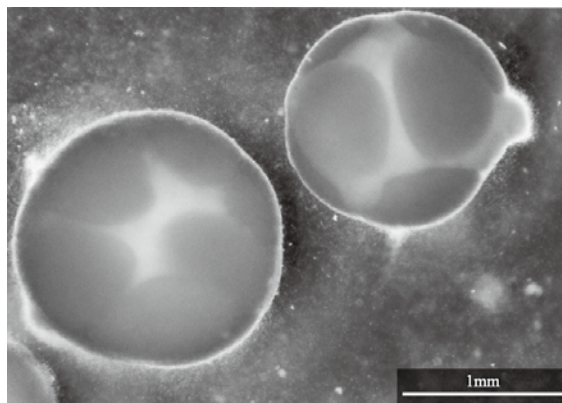


Fig. 3. Egg-sperm bundle of *Acropora* coral collected shortly after release. The bundle is composed of a translucent mucus membrane encapsulating multiple eggs and sperm.

To date, little attention has been paid to the timing of bundle disintegration after they reach the surface, despite its potential importance in understanding the mechanisms of fertilization and reproductive success in broadcast-spawning corals.

Egg-sperm bundles consist of a mucus outer layer that holds the gametes together (Fig. 3). The speed at which this mucus layer breaks down determines when eggs and sperm are released into the surrounding water (MORITA et al. 2006). If egg-sperm bundles disintegrate too quickly, gametes may be diluted or dispersed before encountering others. If disintegration is too slow, fertilization could be delayed or disrupted by environmental turbulence (PASILLA-GAMINO et al. 2011). Therefore, the timing of egg-sperm bundle disintegration may represent a subtle but critical component of coral reproductive strategy.

To investigate this hypothesis, we conducted field and laboratory observations on several *Acropora* species at two reef sites in Amami Oshima Island, southern Japan. These sites were selected for their contrasting environmental conditions: one exposed to open ocean waves and the other located in a calm, semi-enclosed inner bay not directly facing the open sea. We induced spawning of *Acropora* corals collected from two sites in Amami Oshima Island in a tank environment and collected the released egg-sperm bundles immediately after spawning. We then measured the time required for egg-sperm bundle disintegration under controlled seawater conditions. We also recorded spawning timing and we are currently monitoring water temperature as part of ongoing observations.

Our observations revealed differences in disintegration timing between species, as well as between sites. Egg-sperm bundle disintegration speed differed among *Acropora* species at both the exposed and the sheltered sites. Furthermore, for the same species, egg-sperm bundles from colonies in the calmer inner bay took longer to break apart than those from the exposed site. These patterns suggest that egg-sperm bundle disintegration speed is a plastic trait, potentially influenced by both genetic factors and environmental cues.

We propose that this flexibility allows corals to fine-tune their reproductive success based on local conditions. In offshore-facing sites, faster egg-sperm bundle disintegration may promote mixing with gametes from other colonies before dispersion occurs, thereby enhancing the chances of successful fertilization. In calmer settings, slower egg-sperm bundle disintegration may help facilitate gamete dispersal, contributing to wider distribution and genetic diversity. This adjustment in reproductive timing at the gamete level may enhance fertilization efficiency and help maintain genetic diversity, especially under changing environmental pressures.

Our findings contribute to a deeper understanding of coral reproductive ecology and underscore the importance of subtle behavioral and physiological traits in population persistence. As coral reefs face increasing stress from global and local factors, insights into adaptive reproductive strategies may help inform future conservation and restoration efforts.

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Phenology of Subtropical Trees in Amami Oshima

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Abstract

Tree phenology is influenced by changes in photoperiod and air temperature. In autumn, tree growth declines with short photoperiod, and in winter, growth is suspended due to low air temperatures. In spring, rising temperatures trigger growth. The suspended growth in winter can resume only after a sufficient amount of cold exposure has been achieved. Hence, the progression of global warming is expected to disrupt this winter–spring phenology by increasing the air temperature during winter. This disruption may be profound in the subtropical zone, where winters are mild. However, knowledge of winter–spring phenology in the subtropical zone is rudimentary, and this makes it difficult to predict how winter–spring phenology will be affected by global warming. The presentation discusses bud growth and its related physiology in subtropical trees growing in Amami Oshima, Japan, to provide a better understanding of winter–spring phenology in the subtropical zone.

Keywords: bud growth, physiology, subtropics, winter–spring phenology

The phenology of trees is sensitive to environmental factors such as photoperiod and air temperature. The active growth of trees in summer gradually declines in autumn by perceiving the short photoperiod. In winter, growth of trees is suspended by the exposure to the low air temperature (Fig. 1). After trees have been exposed to a certain period of low air temperature and air temperature rises in spring, trees initiate growth (Fig. 2). Recent progression of global warming has raised concerns regarding the disruption of winter–spring phenology by increasing the air temperature during winter.

One way to understand the winter–spring phenology in trees is by observing the ability of buds to grow. Although growth of the bud is suspended in winter, its intensity of growth suppression gradually relieves by the exposure of low air temperature in winter: if the tree is not exposed to a sufficient amount of low air temperature during winter, buds cannot grow even under growth promoting conditions in spring.

The subtropical zone is characterized by having a warm winter. Furthermore, the progression of global warming is expected to further increase the air temperature in this zone. Trees growing in the subtropical zone also show winter–spring phenology, and the progression of global warming may impede the process of this phenology. However, the winter–spring phenology is not well studied in the subtropical zone, thus, it is difficult to predict how the winter–spring phenology in this zone shifts with global warming.

In the presentation, I will discuss the characteristics of bud growth and its related physiology in sampled trees (Fig. 3) which were growing in an evergreen broadleaved forest in Amami Oshima (Fig. 4–6), Japan, which is located in the subtropical zone.



Fig. 1. A tree displaying the winter–spring phenology.



Fig. 2. A tree initiating growth in spring.



Fig. 3. Sample collection.



Fig. 4. Evergreen broadleaved forest in Amami Oshima.



Fig. 5. Subtropical forest in Amami Oshima.



Fig. 6. Study site.

Control of Black Flies on Small Islands in Kagoshima Prefecture, Japan

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Abstract

Among the small islands in Kagoshima Prefecture of Japan, Nakanoshima Island and Kuroshima Island are known to be inhabited by black flies that feed on human blood. These two islands share similar topographical features: rivers are large relative to the island size, flat land is scarce, and most settlements are located near the coast. The species that feeds on humans on these two islands is *Simulium japonicum*, which is distributed from Hokkaido to Okinawa in Japan. On the larger islands, it inhabits fast-flowing rivers in relatively highland areas; however, on these two islands, it occurs in residential areas near the coast, causing bloodsucking damage. Although the local government has been controlling black flies since the 1980s, and the damage has been significantly improved, some residents still complain of bloodsucking damage.

Keywords: black fly, Kagoshima, Kuroshima Island, Nakanoshima Island

Black flies (family Simuliidae, order Diptera) include over 2,300 global species and 76 in Japan. Female adults feed on blood from birds and mammals to produce eggs and live in areas with running freshwater. Their bites can cause significant medical and socioeconomic issues, including tourism decline, animal deaths, and transmission of diseases like onchocerciasis. Human onchocerciasis (river blindness), prevalent in Africa and the Americas, is not found in Japan. However, zoonotic onchocerciasis cases have been reported worldwide, including in Japan. Fortunately, zoonotic onchocerciasis has not been found in Kagoshima Prefecture. On Nakanoshima Island and Kuroshima Island, two small islands in Kagoshima Prefecture, residents on the islands have long suffered from black fly bites.

Four black fly species are found in Nakanoshima Island: *Simulium aureohirtum*, *S. morisonoi*, *S. japonicum*, and *S. tokarensis*. Only two species, *S. japonicum* and *S. uchidai*, are found in Kuroshima. Among them, only *S. japonicum* bites humans and is distributed widely across East Asia. The bloodsucking damages of *S. japonicum* are also seen in other areas. However, those are limited in the mountain area, and there is almost no bloodsucking damage by *S. japonicum* in urban areas. Larva of *S. japonicum* in most areas live in a relatively high-altitude and fast-flowing river, and are often far from residential areas. Nakanoshima

Island and Kuroshima Island share similar topographical features. The rivers are large relative to the size of the islands. There is little flat land, and most settlements are located near the coast. Therefore, rivers near coastal villages also flow relatively fast. These two islands are adjacent to the habitats of the black-bellied beetle and humans, and bloodsucking damage is frequently observed.

Black fly control in Japan began in the 1950s, using DDT to treat rivers where black fly larvae caused severe bloodsucking damage. Due to environmental concerns, Abate replaced DDT in the 1970s, offering lower risks to humans and fish. Although no targeted control was applied to *S. japonicum* on mainland of Japan, efforts began in Nakanoshima Island in the 1980s led by Dr. SUZUKI Hiroshi. In 1982, Abate was introduced into five rivers on the island at regular intervals. Larval and adult populations were monitored before and after each application. Results showed a marked decline in adult black flies and a general decrease in larvae, successfully reducing biting damage. SUZUKI's work was deeply appreciated and remembered even decades later, marking a significant improvement in local quality of life.

Despite successful black fly reduction, Nakanoshima Island continued control efforts with Kagoshima Prefecture's support. From 2000, Midei (Diflubenzuron) replaced Abate due to supply issues, and BT (*Bacillus thuringiensis* toxins) was introduced in 2014. BT targets Diptera, such as mosquitoes and black flies, with less impact on other insects than Abate. While Abate's efficacy was studied from 2007–2010, BT's effectiveness hadn't been assessed until a 2018 survey at 13 freshwater sites. Black fly larvae and pupae were found at only four sites, mostly upstream, suggesting effective insecticide coverage. Though over 1,500 black flies were recorded feeding in three hours before the 1980s, current numbers are much lower. Insecticide is applied bi-monthly, but due to incomplete control, seasonal increases, and untreated rivers in the southern part of the island, *S. japonicum* continues to occur.

Insecticides were also employed to control black flies on Kuroshima Island, concurrently with their use on Nakanoshima Island. Although the black fly population on Kuroshima was lower than on Nakanoshima Island, insecticide application significantly reduced the damage caused by bloodsucking. The process of applying insecticides in river environments was physically demanding, and as the incidence of bloodsucking declined, applications became less frequent. Currently, insecticides are being used routinely in response to renewed complaints of bloodsucking damage. However, outdated insecticides are still in use and should be replaced with BT.

It is clear that damage caused by black flies is an important problem for people living in the islands, and the use of insecticides to control the damage is also necessary. However, the use of insecticides in rivers imposes a substantial environmental burden, making proper monitoring and evaluation of their effectiveness essential.

Why Did the Japanese Plum ‘Karari’ Originating from Taiwan Take Root in Amami Oshima?

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Abstract

In this presentation, we will examine why Japanese plum originating from Taiwan was able to take root on Amami Oshima. The Japanese plum ‘Karari’ (花螺李) was brought into Amami Oshima from Taiwan in 1935. Currently, ‘Karari’ is cultivated mainly in Yamato Village, where they make a significant contribution to the local economy as a specialty product. However, it is still unknown why ‘Karari’ took root in Amami Oshima including the environmental factors. Based on the results of fieldwork conducted in Yamato Village, we will discuss why ‘Karari’ took root in Amami Oshima.

Keywords: Amami, Japanese plume, Karari

The Japanese plum ‘Karari’ (花螺李) is a local variety cultivated in Amami Oshima. It was brought from Taiwan in 1935. In Yamato Village at Amami Oshima, the research site of this study, cultivation of ‘Karari’ began in the 1950s. ‘Karari’ trees were planted in the mountainous area or home gardens in the village at begin, and most of the production were consumed by villagers. In the 1970s, rice cultivation declined due to a rice acreage-reduction policy. Instead, fruit trees cultivation such as Japanese plums were earnestly encouraged in Yamato Village. Currently, Japanese plum ‘Karari’ is traded as “Amami Plums” and have become one of the popular products of Yamato Village (Fig. 1).

In fact, there are many unknowns regarding why ‘Karari’ can grow in Amami. This is because Japanese plums generally require low temperatures during winter for bud bursting in spring, however, Amami Oshima rarely experiences low temperatures (Fig. 2). Despite this, ‘Karari’ is able to grow well. Furthermore, it is unclear how the people of Yamato Village accepted fruit trees cultivation after the rice acreage-reduction policy started.

In this presentation, based on the field research conducted in Yamato Village, we will discuss about the reasons why ‘Karari’ was able to take root in Amami Oshima. However, since this research began last year, this presentation will be an interim report of the project. Therefore, in this presentation, we will mainly introduce the social factors that made it possible to cultivate ‘Karari’ in Yamato Village. In particular, we will discuss why ‘Karari’

was accepted in Yamato Village, focusing on the relationship between the traditional agricultural practices that had been carried out in the Village and the ‘Karari’ cultivation. Furthermore, we will also discuss the prospects for future research.



Fig. 1. A picture of the plum in Yamato Village.



Fig. 2. Plum blossom.

Social Capital, Household Income, and Food Insecurity in Small Islands: Insight from Maluku, Indonesia

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Abstract

Maluku province is an archipelagic region with abundant potential for marine and fishery resources, agriculture, and tourism. However, food insecurity, the poverty rate, stunting, and the prevalence of undernourishment are still higher than those at the national level. This study investigated the association between social capital and culture, economic (consumption and income), ecological (land property rights and plantation biodiversity), and food insecurity in Haruku village. Haruku village on Haruku island is an indigenous community cultivates plantations in the *Dusung* systems ecology. We collected data from 80 households on Haruku Island. Then, we analyzed the household expenditure for food and non-food, and used Smart PLS 4 to find the association between variables. Results showed 68.84% household expenditure was allocated for food and 31.16% for non-food. Social culture, household consumption patterns, and income from local food production significantly influence and reduce food insecurity. Albeit local food, imported rice, and flour consumption will reduce food insecurity. This implies that improving household income, strengthening social culture, fostering biodiversity, and diversifying local food consumption are crucial to improving sustainable food insecurity in the small islands.

Keywords: ecology, economy, food insecurity, household expenditure, social culture

Introduction

Food is the basic need of people and, therefore, the human right of every individual. Ideally, people in the world must have secure food to eat. Food security is a right of individual and households, at any time, to have physical and economic access to consume nutritious, balanced, and safe food, to fulfill calorie needs according to their own preference and culture in order to perform a productive and healthy life (WORLD FOOD SUMMIT 1996). Food security involves food supply, distribution, food safety, and consumption. The crucial importance of food security can be seen in the second goal of the Sustainable Development Goals (SDGs), that is, zero hunger. Most nations are still fighting to reduce hunger. It is around 8.045 billion people in the world, and there are about 2.326 billion who have experienced moderate food insecurity, and 864 million are facing severe food insecurity.

These people who are severely food insecure: 467 million in Asia, 316 million in Africa, 58 million in Latin America and the Caribbean, and 18 million people in Northern America

and Europe (FAO 2024). One of the main indicators of food insecurity is the prevalence of undernourishment (PoU) that has increased in the last 5 years from 7.5% (581 million people) in 2019 to 9.6% (733 million people) in 2022. Indonesia, which has a total population of 282,477,584 people in 2024, is facing food insecurity in terms of PoU and stunted children, especially in the archipelagic regions. There are about 23 million people who are unable to meet their dietary requirements, and over 19,8% of children under five are stunted (impaired growth due to malnutrition). Maluku archipelago province, 1.92 million population in 2024, and 92% of the region is sea and 8% is land, the score of the PoU was 31.68% or three times higher than the national score. In 2023/2024, Indonesia, for the first time, stopped importing rice because Indonesia was able to achieve its national rice production target, that is, 34.6 million tons, milled equivalent. However, BPS (2024) found that 10 of 11 districts and cities in the province of Maluku consume less than 2100 Kcal per capita per day. Further, annual rice consumption has increased significantly to 195.8 thousand tons of rice, but Maluku must import about 150.9 thousand tons of rice each year. The economic value is about IDR 2.3 trillion (USD150 million) per year or 76.7% of the provincial annual budget. Government policy is to reduce rice consumption gradually and increase the consumption of non-rice and local foods like sago, corn, and tubers. Indonesia has about 5.5 million ha of sago palm that is able to produce about 465 million tons of sago dry flour per year. The Maluku Islands have about 60,000 ha and are able to produce about 400,000 tons of dry sago flour per year.

Food Security in Haruku: Linking Social, Economy, and Ecology

Haruku Island, part of the Lease cluster islands, is a small island in the central Maluku regency, the province of Maluku. In the past, most people on the island consumed local food, such as sago, tubers, and bananas, but now they consume rice as a staple food. This occurred because of the government's policy to provide rice for the poor people and rice price subsidy in the last three decades. As a result, the local community is more dependent on imported rice, including flour, sugar, and vegetables.

Table 1 showed that households spent about 24% imported food (14% rice, 7,8% flour, and 2.4% sugar), whilst local food was only 3.5% (1.7% for sago, 1.3% tuber, and 0.5% for breadfruit). The main source of protein was 15.7% from local sea fish, 4.7% from imported non-local food, including cooking oil, fat, vegetables, and others. It can be seen that the local community is dependent on imported food. Household spent about 69% on food and the remaining 31% on non-food expenditures. This structure of expenditure shows that most households are poor households because they are struggling to fulfill staple food, which limits their budget to fulfill non-food basic needs such as energy and electricity, education, transportation, and health.

well as enhancing rice and flour consumption, will significantly reduce food insecurity. The higher the local food production, the higher the consumption of imported rice and flour. This means that local food and imported rice (and flour) are not substitutes but complementary foods. On one side, that is food diversification, but on the other side, that is ironically because local farmers might sell local foods to buy imported rice and flour. The local community perceived that rice and flour had become the primary and superior goods, whilst local food was a secondary or inferior staple food.

Third, ecology in terms of plantation biodiversity in the *Dusung*² Farming Systems positively and significantly influence local food production (GIRSANG et al. 2023) and reduce the consumption of imported rice and flour. *Sasi* significantly influences land property rights that significantly influence plantation biodiversity. That implies that ecology and economy (production and consumption) are in a trade-off. Enhancing ecology and biodiversity will increase local food production and consumption, which will reduce rice and flour consumption.

To sum up, social culture together with economy and ecology influence significantly to reduce food insecurity. This implies that ecology and biodiversity, and social culture are the foundation of sustainable food production, consumption and food security in small islands.

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² The *Dusung* systems is intangible indigenous technology that integrated the whole area from the forest-landscape to the seascape that consist of multiple and hierarchical trees, plantations, edible fruits, and horticulture, mangroves and coral reef to conserve small island biodiversity, food security, economy, and ecology.

Species Composition and Characteristics of Agroforestry in Ambon Island, Indonesia: Comparison of Plots at Different Distance from the Village

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Abstract

Indigenous agroforestry systems called *dusung* has been practiced for a long time in Maluku Province, Indonesia. In the *dusung*, spice, fruit, palm, and crops are cultivated. Even though the *dusung* is socio-economically very important, detailed agricultural practices, including crop selection, planting, and management, especially on multiple tree crops have not been well studied. Therefore, we selected one household possessing four plots of *dusung* in Allang Village, West Leihitu District, Central Maluku Regency and explored species composition patterns. 1,079 trees (40 species in 22 families) were recorded in the four plots. *Mayang*, *gayang*, *duku*, and *langsas* were found in all plots, indicating that they are likely to distribute widely in this area. *Pala* and *cengkeh* distributed in all four plots except the Wailulung plot, while *pule*, *kanari*, *klapa*, *duriang*, *ganemu*, and *lenggua* distributed in all plots except the Wetita plot. These may be due not only to natural environmental factors but also to intentional cultivation management by the surveyed household.

Keywords: duku, ethnobotany, langsas, sugar palm, tropical agriculture

Indigenous agroforestry systems called *dusung* has been practiced for a long time in Maluku Province, Indonesia (MATINAHORU 2014). In the *dusung*, spice (clove and nutmeg), fruit (durian, mangosteen, langsas, breadfruit, jackfruit, etc.), palm (coconut, sago palm, and sugar palm), and crops (cassava, sweet potato, taro, cocoyam, banana, maize, various vegetables, etc.) are cultivated. Local people recognize the *dusung* as one ecosystem from forest to sea, such as forest (*ewang*), multiple tree crops (*dusung* in the narrow sense), fallow

land (*a'ong*), house yard, homegarden, and horticultural land (*kintal* and *kabong*), and coastal area (*mange-mange*, *pesisir*, and *laut*; GIRSANG *et al.* 2023). Even though the *dusung* is socio-economically very important, detailed agricultural practices, including crop selection, planting, and management, especially on multiple tree crops have not been well studied.

Therefore, we selected one household possessing four plots (Hutil, Wetita, Hatunang, and Wailulung) of *dusung* (in the narrow sense) in Allang Village, West Leihitu District, Central Maluku Regency, measured them with level survey, and explored species composition patterns there in January and October, 2024 and March, 2025 (Fig. 1). Within the plots, we conducted a census of all living useful trees > 1.3 m tall; we identified useful tree species and recorded diameter at breast height (1.3m), tree height, tree age, and the position of each individual.

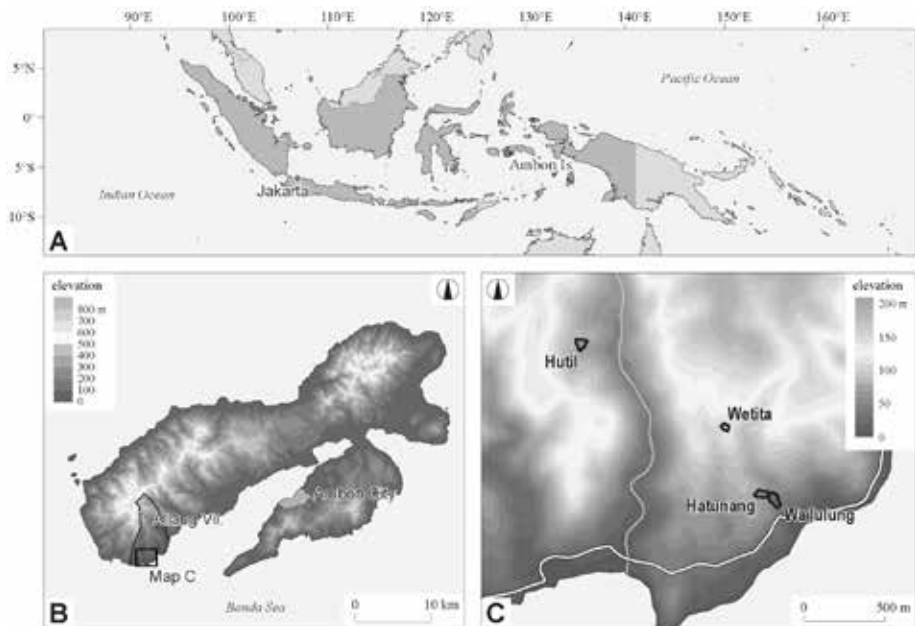


Fig. 1. Study area.

1,079 trees (40 species in 22 families) were recorded in the four plots. *Mayang* (*Arenga pinnata*), *gayang* (*Inocarpus fagifer*), *duku* (*Lansium domesticum*), and *langsa* (*L. domesticum*) were found in all plots, indicating that they are likely to distribute widely in this area. *Pala* (*Myristica fragrans*) and *cengkeh* (*Syzygium aromaticum*) distributed in all four plots except the Wailulung plot, while *pule* (*Alstonia scholaris*), *kanari* (*Canarium ovatum*), *klapa* (*Cocos nucifera*), *duriang* (*Durio zibethinus*), *ganemu* (*Gnetum gnemon*), and *lenggua* (*Pterocarpus indicus*) distributed in all plots except the Wetita plot. These may be due not only to natural environmental factors but also to intentional cultivation management by the surveyed household.

Species Composition and Characteristics of Agroforestry in Ambon Island, Indonesia:
Comparison of Plots at Different Distance from the Village

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Foreign Doctors on Small Islands of Okinawa

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Abstract

After World War II, Okinawa faced a severe shortage of doctors, worsened by the loss of local physicians during the Battle of Okinawa and difficulties in training new doctors while the prefecture was separated from Japan. To maintain clinics in remote islands, the prefectural government relied heavily on foreign doctors; 15 Korean and 6 Taiwanese doctors served under this foreign physician program. Challenges included media criticism from Korea regarding brain drain and the tragic 1979 murder of Dr. JEONG Bo-ok on Kita Daito Island. These experiences prompted Okinawa to encourage the return of scholarship doctors, expand doctor-dispatch programs, and establish new medical education institutions. By the early 1990s, the situation had improved enough to terminate the foreign doctor program, yet remote islands remain vulnerable to doctor shortages even when overall prefectural numbers appear sufficient.

Keywords: doctor shortage, Korean doctors, medical education initiatives, Okinawa Prefecture foreign physician program, remote islands

Shortage of Doctors in Remote Areas

Doctors are generally scarce in remote areas. In Okinawa, the situation was aggravated by the loss of local doctors during the land battle and by difficulties in training new doctors while the prefecture was administratively separated from Japan. The geography of the islands further limited the benefits of improved transportation. Paved roads and motorization did not significantly enhance access to medical facilities. Under these circumstances, Korean and Taiwanese doctors were recruited to maintain local clinics.

By July 1977, five years after Okinawa's reversion to Japan, there were 49 clinics in remote areas (Fig. 1). Twenty-four were run by the prefectural government and attached to one of five prefectural hospitals, while 20 were run by municipal governments. Thirteen clinics were staffed by Korean or Taiwanese doctors, 11 by "medical service men" (assistant doctors unique to postwar Okinawa), and 10 by mainland Japanese doctors dispatched through a government aid program. Ten clinics were not operating due to vacancies or closures, and only four had fully qualified Okinawan doctors.

Recruitment of Korean Doctors

Many Korean doctors over 50 in the early 1970s had been trained at Japanese medical schools and held licenses recognized in postwar Japan with minimal revision. In November 1974, responding to a request from the Okinawa prefectural government, the first group of four Korean doctors arrived: HEO Gi-ok 許琦玉 (67), Osaka Imperial University graduate, assigned to Iheya Island; HA Yong-geun 河龍根 (58), Daegu Medical School graduate, Minami Daito Island; GONG Sang-taek 孔相沢 (55), Daegu Medical School graduate, Kita Daito Island; and KIM Min-ryu 金敏流, Tarama Island.

They signed renewable two-year contracts. They accompanied their wives, who faced no language barriers, but left children in Korea because they did not speak Japanese. All had been operating private clinics in Korea. When asked why they accepted overseas assignments, Dr. HA replied, “Medicine is the art of compassion and knows no borders. I want to help those less fortunate in Okinawa as much as I can.” This explanation, however, may not fully account for their motives.

The Murder of Dr. JEONG Bo-ok

Records on foreign doctors in Okinawa are scarce, but the murder of Dr. JEONG Bo-ok 鄭宝玉 generated extensive documentation. On 17 June 1979, Dr. JEONG (63) was killed in her clinic on Kita Daito Island. A graduate of the Imperial Women’s Medical College in Tokyo, she had previously practiced in Manchuria with her Korean husband. Widowed, she raised five children while maintaining a clinic in postwar Korea. Encouraged by a former classmate, she joined the second group of Korean doctors dispatched to Okinawa in December 1977. Okinawan newspapers reported that, motivated by Christian faith, she requested a posting “to any place so remote that other doctors would be reluctant to be assigned.”

Criticism and Media Response in Korea

Korean media questioned the incentives of Korean doctors working in Japan. Articles emphasized their high salaries, suggesting financial motives. Dr. JEONG, for instance, earned 860,000 yen per month (2,150,000 won), compared with 500,000 won for doctors in Korean government hospitals.

Other reports alleged reputational motives. Some former high-ranking officials who had failed to secure positions or run clinics after retirement left Korea to work in Japan. Examples

included a former Assistant Minister of Health in Aomori, a former Director-General of the Seoul Social Bureau in Kita Kyushu, and a former ROK Navy Surgeon General in Nagano.

An estimated 450-800 Korean doctors were working in Japan. Korean media denounced this as a brain drain and criticized Okinawa for exploiting Korea's medical resources. An Okinawan newspaper echoed these concerns, noting the prefecture had 1,492 residents per doctor versus 868 nationally, but Korea's figure was even higher at 2,571.

Politicization and Funeral Proceedings

Korean media further politicized Dr. JEONG's murder, suggesting it might be racially motivated. On 21 June, while the suspect was still at large, Dr. YUN Jeong-cheol, her elder son, attended a prefectural funeral in Okinawa.

He then returned his mother's remains to Korea, accompanied by an Okinawan delegation of officials, the Kita Daito village chief, and Okinawa Medical Association representatives. Upon arrival, Vice Governor HIGA Mikio met with the Korean Bureau of Health and Welfare to explain the incident and express remorse.

On 25 June, while attending the funeral in Seoul, HIGA was asked by reporters and by Foreign Minister PARK Dong-jin whether the murder stemmed from ethnic discrimination. He denied the accusation, stressing Okinawa-Korea "closeness" and likening Japan's colonization of Korea to the U.S. military administration of Okinawa, citing shared wartime devastation.

The suspect, later arrested, was a local juvenile with severe sexual behavior disorders. Dr. YUN reportedly chose silence over public condemnation. In a 1990s interview, he recalled that his resentment faded after learning the boy had grown up in poverty. He appeared to hold faith in his mother's missionary calling, stating: "People advised me to press charges and turn it into an international issue, but I concluded that it was not my mother's wish."

Discussion

In reconsideration of the excessive dependence on foreign doctors, the Okinawa prefectural government made active efforts to secure doctors through other channels. First, the return of Okinawan doctors who studied medicine in Japan on government scholarships was encouraged. Although government-funded medical education for Okinawans in Japan had commenced in 1949, 205 former students were remaining in mainland Japan after graduation, citing inadequate training facilities in Okinawa. Second, efforts were made to expand the Ministry of Health's doctor dispatch system. During fiscal year 1978, a total of 201 doctors

were sent to Okinawa on a short time basis, providing a total of 4,824 clinic days.

In addition to these emergency measures, long-term measures also began to yield results. Okinawan graduates of Jichi Medical University—a special institution established to train doctors for rural and underserved areas—began returning in 1980. The University of the Ryukyus launched its own medical education program in 1981. By the early 1990s, the number of doctors in Okinawa was improved to the extent that the prefecture no longer had to rely on foreign doctors.

In the 17 years since 1974, a total of 16 Korean doctors took up assignments in Okinawa. By the early 1990s, these doctors had aged, and physician recruitment had improved. As a result, the Okinawa prefectural government terminated its foreign physician program in 1991.

This historical episode offers insights into contemporary issues in medical services. First, medical professionals tend to migrate from developing countries to developed countries, exacerbating the medical challenges faced by the former. Qualifications and language often facilitate this migration between former colonies and their metropolises (e.g., Hong Kong nurses in the UK). Second, remote islands can remain medically underserved even when the overall doctor shortage has been alleviated at the prefectural level. For instance, while Okinawa Prefecture, classified as having a high doctor-to-population ratio, became subject to reductions in medical school quotas in 2024, the residents of Yonaguni Island are anxious about the prospect of having no doctor, unable to find a replacement for the physician of the local clinic whose contract expires in this coming March.

Prefectural 県立		Transferred 町村立移管	
伊平屋	▲黄炎発	宜野座	○真栄城守快
伊原名	☆藤江良雄	仲里	☆高田大緑
奥	vacant	佐良浜	☆今村弘
安田	■朴路鉦	波間開	○生盛邦雄
平良	○嶋波正善		
古宇利	■張炳榮		
瀬底	○平良順一		
嘉陽	closed		
久志	○仲嶺真栄		
伊計	closed		
宮城	■金弘勝		
浜 (勝連)	○上間正孝		
津堅	■孔相澤		
久高	○西山勇		
渡嘉敷	■白益寿		
座間味	○仲里和雄		
阿嘉	○西田由太郎		
渡名喜	■李秉洛		
真栄	○上原信康		
北大東	■鄭寶王		
南大東	■河電根		
池間	☆永井久之		
多良間	■金源培		
伊原間	closed		
大原	closed		
西表西部	☆下田正夫		
小浜	○大島俊吉		
鳩間	closed		
糸間	vacant		

Municipal 町村立	
国頭	▲鄭青松
大宜味	☆椋見崎喬
今帰仁	▲陳哲雄
本部医院	金城康登
伊江	山城正登
恩納	砂川豪甫
読谷	☆燕木多津之
具志川	☆永井吉三
金武	☆平田千種
与那城	vacant
東風平	vacant
城辺 (委託)	新城孝雄
伊良部	■張介一
黒島	○城田信弘
竹富介輔	vacant
与那国	☆杉山正

○ Medical Service Man
▲ Taiwanese Doctors
■ Korean Doctors
☆ Japanese assignee

Fig. 1. Clinicians at local clinics in remote areas in Okinawa (1 July 1977).

Trading Seaweeds: An Anthropological Study of the Gelidiaceae Distribution Network in Taiwan

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Abstract

Off the coast of northeastern Taiwan, free-diving collection of Gelidiaceae has continued since the Japanese colonial period. This presentation focuses on a local wholesaler who purchases fresh Gelidiaceae from divers and sun-dries it. One wholesaler, Mr. A, not only acts as a bridge between collectors and wholesalers, but also has developed various innovative systems to ensure a stable supply of high-quality Gelidiaceae in large quantities. He has also actively promoted Gelidiaceae from northeastern Taiwan, contributing to expanding distribution channels and revitalizing the local industry. However, faced with declining consumer demand and declining Gelidiaceae resources due to the COVID-19 pandemic, Mr. A switched from his main occupation to other fields, such as construction, while continuing to support his wholesale business for the local community. His adaptability symbolizes the resilience and multifaceted lifestyles of coastal people who sustain their livelihoods through diverse economic activities.

Keywords: Gelidiaceae, Northeastern Taiwan, wholesaler

Gelidiaceae Harvesting in Northeastern Taiwan's Coastal Waters

In coastal villages along this northeastern cape, skin diving-based seaweed harvesting flourished during the Japanese colonial period and continues to this day. The local term for Gelidiaceae “*Tsioh hue a*” is a broad classification that includes the following three species: 1) *Gelidium elegans* (“*Hong bue*” in Taiwanese), 2) *Gelidium japonicum* (“*Tua pun*” in Taiwanese), and 3) *Pterocladia capillacea* (“*Se pun*” in Taiwanese).

Between the second and early fifth months of the lunar calendar, men and women over 60 years old can be seen skin free-diving in wetsuits, wearing handmade balaclavas and mono- or binocular goggles to collect Gelidiaceae growing on rocks at a depth of about 1-5 m. The freshly harvested red-purple seaweed undergoes repeated washing with freshwater and sun-drying—typically six cycles—eventually turning ivory in color. Through this process, the weight of the seaweed is reduced to approximately one-third of its original wet weight.

The dried Gelidiaceae can be boiled and filtered in water to yield a jelly-like extract called “*Shih-hua-dong*”, or further processed using industrial techniques such as freeze-drying or hot-air dehydration under pressure to produce agar.

A Wholesaler Who Brought Innovation to the Gelidiaceae Industry in Northeastern Taiwan

Longdong, located in Gongliao District, New Taipei City, is the most active site for Gelidiaceae

trading in northeastern Taiwan. In the Zhang family, who have lived by the sea in Longdong for generations, the founder began purchasing and wholesaling Gelidiaceae for export to Japan in the 1940s. The second generation took over in the 1970s but passed away at a young age in the late 1990s. Mr. A (born in 1974), after graduating from high school, moved to Taipei, obtained a professional chef's license, and operated a seafood restaurant as both owner and head chef. When his father fell ill, Mr. A returned to Longdong around the age of 25 and inherited the family business of Gelidiaceae trading.

What Mr. A inherited from his grandfather and father was a business model in which Gelidiaceae harvested and sun-dried by local male and female skin-divers were purchased, cleaned of debris and calcified portions, and then collected by dried goods wholesalers from Dihua Street in Datong District, Taipei. However, Mr. A did not settle for this traditional approach. Instead, he developed a series of strategies to stably acquire large quantities of *G. elegans*, the most valuable among the three seaweed types.

Collaboration with diving instructors

Upon his return to Longdong, Mr. A established a joint venture with a friend to operate a diving shop on his family's property. As a certified diving license holder himself, Mr. A, in resuming his family's Gelidiaceae trading business, was determined to engage directly in the harvesting process. With an air tank on his back, he personally dived into the coastal waters from Yehliu in Wanli District to Hemei in Gongliao District and meticulously monitored the growth conditions of *G. elegans*. Through this hands-on exploration, he discovered that high-quality seaweed grew in deeper waters—approximately 10 m below the surface—significantly deeper than the 1–5 m range typically accessed by skin-divers. Furthermore, he trained employed diving instructors in harvesting techniques and engaged them to collect *G. elegans* upon request, purchasing their yield.

Engagement with indigenous peoples

Through his growing acquaintance with several Amis men residing in Keelung City, Mr. A recognized the potential of incorporating these individuals into the Gelidiaceae harvesting workforce. Mr. A undertook to train a small group in scuba diving techniques and supported them in obtaining official diving licenses. Simultaneously, Mr. A engaged in underwater harvesting alongside them, during which he provided instruction on two critical aspects: 1) the physical characteristics—such as color and texture—that distinguish high-quality *G. elegans*, and 2) the specific aquatic zones where such *G. elegans* could be found. To further formalize and incentivize this collaboration, Mr. A proposed a long-term trading agreement. Under this arrangement, if the divers delivered freshly harvested seaweed to Mr. A on the same day of collection, he would provide immediate cash payment calculated based on the wet weight and a pre-set annual unit price per 600 g. By the spring of 2019, individual divers were averaging 140–160 kg of wet *G. elegans* per day (equivalent to NT\$7,000–8,000 in daily earnings), with the most productive reaching up to 200 kg (NT\$10,000). At the peak of the season, Mr. A maintained stable, exclusive trading relationships with approximately 30 Amis divers.

Mr. A's pioneering daily-payment model for Amis divers was soon emulated by a pair of twin sisters who operated a combined fishing gear store and diving shop in Longdong. As a result, three wholesalers in the area, including Mr. A, began functioning as primary buyers of freshly harvested wet *G. elegans*, which they sun-dried and resold to clients in other regions. All three adhered to standardized

pricing, effectively institutionalizing this novel procurement and distribution system within the local Gelidiaceae economy.

Expansion of sales channels

Mr. A did not limit his sales to traditional dried goods wholesalers along Dihua Street in Taipei. He actively expanded his distribution network to include major wholesalers in other regions, such as the dry goods market on Sanfeng Central Street in Kaohsiung, established a commercial relationship with a food processing manufacturer in Tainan City. Leveraging his culinary background, Mr. A developed customized recipes for “*Shih-hua-dong-yin*”—a thickened Gelidiaceae-based beverage—for each retailer. By providing detailed preparation methods and tailored product concepts, he effectively created new demand for Gelidiaceae. He also commissioned the production of visually appealing plastic bottles bearing his brand logo and began selling vibrantly colored “*Shih-hua-dong-yin*” to young visitors participating in scuba diving activities or touring the Geopark. According to Mr. A, he was the original inventor of the “*Shih-hua-dong-yin*” format, which has since gained popularity throughout neighboring coastal areas. Today, it is commonly served as a signature drink at seafood restaurants along the northeastern coast of Taiwan.

High-end bottarga production as a seasonal winter occupation

Mr. A’s procurement, sun-drying, and wholesale operations for Gelidiaceae are highly seasonal, typically concluding between April and late September. During the off-season, he co-managed the diving shop but also sought alternative income-generating activities. In winter, he began producing bottarga, a delicacy made from the roe of mullet fish, sourced from local fishers in Longdong. Around the age of 32, Mr. A became interested in bottarga production and, upon consulting a friend, was introduced to a factory in Tainan specializing in this traditional craft. Mr. A’s bottarga became so popular among celebrities and high-ranking officials that he switched to made-to-order production and began making only high-quality bottarga for 600 g that costs NT\$7,000–8,000 each year. Apparently, high-quality bottarga makes a very popular gift for the Chinese New Year.

Hardships during and after the COVID-19 pandemic

Mr. A was severely impacted by the economic downturn and mobility restrictions brought about by the COVID-19 pandemic in 2020. Concurrently, the increasingly evident decline in Gelidiaceae resources further undermined the sustainability of his wholesale operations. During the pandemic, Mr. A left Longdong, began assisting his paternal aunt’s husband, who operated a construction contracting firm specializing in large-scale building projects.

Upon relocating, Mr. A discontinued the labor-intensive process of purchasing freshly harvested Gelidiaceae. Instead, he adopted a more flexible and less time-consuming method: purchasing only fully sun-dried Gelidiaceae from elderly male and female skin-divers in Longdong and surrounding communities. Under this revised system, Mr. A would return to Longdong for a few days each spring or summer, drive his truck to individual households to collect stored dried Gelidiaceae, and entrust long-distance shipping to a logistics company. This approach enabled him to maintain his wholesale business on a much smaller scale. As a result, the annual volume of dried Gelidiaceae handled by Mr. A—which stood at 12,000 kg in 2019—declined sharply to 600 kg in 2023, and modestly recovered to

1,800 kg in 2024. Meanwhile, due to both resource depletion and inflationary pressures, the wholesale price for 600 g of dried Gelidiaceae rose significantly: from NT\$370–400 (depending on purchase volume) in 2019 to NT\$550 in 2024.

At one point, Mr. A seriously considered withdrawing from the Gelidiaceae business altogether. However, long-standing clients—including a food processing manufacturer in Tainan—expressed dissatisfaction with the quality of Gelidiaceae sourced from alternative suppliers and urged Mr. A to continue trading, stating that the quality of their final products could only be maintained using Gelidiaceae procured from him.

Following his operational shift, Mr. A introduced all of the Amis divers with whom he had previously maintained exclusive purchasing agreements to two other local wholesalers in Longdong, facilitating new trading relationships. However, while he was away, a particular couple—long-time free-divers from Longdong who had previously sold him large volumes of dried Gelidiaceae—initiated direct transactions with a Kaohsiung-based food manufacturer, bypassing Mr. A entirely. Although the couple received a higher price than Mr. A had previously offered, and the manufacturer acquired the product at a lower cost than through Mr. A, the anticipated quality was not met. As a result, the manufacturer resumed trading with Mr. A in 2025.

Thus, Mr. A experienced the dual setback of relinquishing proprietary knowledge—such as optimal harvesting sites and methods—to competitors, and temporarily losing a major client. Nevertheless, he chose to accept these challenges, driven by the conviction that “the traditional industry of harvesting, drying, and trading Gelidiaceae in northeastern Taiwan must not disappear during my generation.”

Conclusion

Mr. A, the third-generation successor of the Zhang family business engaged in Gelidiaceae wholesale since the Japanese colonial period, did not merely adhere to the traditional intermediary role of purchasing from harvesters and selling to clients to earn the price differential. Rather, he proactively introduced new actors from outside the production area, such as diving instructors and Amis, to secure a stable and large supply of high-quality *G. elegans*. By establishing a purchasing system that benefits both the harvesters and him, he strengthened the supply chain.

The visible success of Mr. A's business inspired the emergence of new wholesalers in Longdong, thus providing both economic stimulus and benefits to the local Gelidiaceae production area. Nonetheless, it must be acknowledged that the harvesting and trading of Gelidiaceae remain highly seasonal livelihoods, and cannot be considered a fully sustainable local industry.

In general, coastal workers maintain diverse livelihoods, combining multiple tools and switching target species according to season and marine conditions, often integrating agriculture or itinerant trade. Likewise, in Longdong and surrounding coastal villages, Gelidiaceae harvesters have long engaged in abalone farming, interior work, or marketing catches from fisher spouses, while wholesalers have combined seaweed trading with running diving shops, guesthouses, fishing, fish wholesale, and bottarga production. In this light, Mr. A's recent occupational shift reflects a continuation of the diversified livelihood strategies traditionally practiced in the area.

A Study on the Draft Amendment to the 台湾漁業規則 (Taiwan Fisheries Regulations) by the 拓殖局 (Colonization Bureau)

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Abstract

In response to the rapid growth of Taiwan's fisheries from small-scale operations to offshore and pelagic expansion in the 1900s, the colonial government enacted the first fisheries legislation—the 台湾漁業規則 (Taiwan Fisheries Regulations)—in 1912; this study examines its background and legislative intent by analyzing a draft amendment prepared by the 拓殖局 (Colonization Bureau), revealing the Bureau's policy aims and the broader colonial governance context.

Keywords: Colonial Taiwan, 台湾漁業規則 (Taiwan Gyogyō Kisoku, Taiwan Fisheries Regulations), 拓殖局 (Takusyoku Kyoku, Colonization Bureau)

Introduction

The 台湾漁業規則 (Taiwan Gyogyō Kisoku, Taiwan Fisheries Regulations; hereinafter, “Gyogyō Kisoku”) were the first legal framework governing fisheries in colonial Taiwan, established in 1912. While the regulations included provisions for fixed-net and designated-zone fishing rights, and introduced a licensing system for trawl fishing and whaling, they notably did not define exclusive fishing rights. As a result, the content of the regulations differed from Japan's domestic fisheries law (伊藤ほか 2016: 92-93).

Although the Gyogyō Kisoku were only in effect for 12 years, until Japan's national Fisheries Law was extended to Taiwan in 1924, Tsai has evaluated the regulations positively. He argues that they were effective in resolving conflicts between old and new fisheries, promoting the development of the fisheries industry, conserving marine resources, and managing fisheries overall—marking an important turning point in the history of Taiwanese fisheries (蔡 2017:165).

Indeed, the regulations were groundbreaking in providing a unified legal framework for fisheries in colonial Taiwan. However, they should also be understood within the broader imperial context: the 1910 enactment of the Meiji Fisheries Law, the annexation of Korea the same year, and the 1911 implementation of the Korean Fisheries Decree. These developments were part of Japan's broader efforts to establish a systematic colonial administration. Therefore, the regulations should not be analyzed solely from internal Taiwanese needs, but

also from how the Japanese empire sought to construct a framework for fisheries governance across its colonies.

This paper, therefore, focuses on the 台湾漁業規則修正案 (Draft Revisions to the Taiwan Fisheries Regulations; hereinafter, “Draft”), prepared by the 拓殖局 (Takusyoku Kyoku, Colonization Bureau; hereinafter, “Takusyoku Kyoku”)—an agency established in 1910 under the direct supervision of the Prime Minister and later reorganized as the Ministry of Colonial Affairs. Through analysis of this document, the study clarifies what intentions the Takusyoku Kyoku had regarding fisheries governance in Taiwan.

About the Draft

The Draft is an 84-page booklet, including the cover. The cover bears the inscription “朱書ハ拓殖局修正意見” (“Red-ink notes are the revisions of the Takusyoku Kyoku”), confirming that the bureau was responsible for its preparation. The exact year of composition is unclear, but the Gyogyō Kisoku were officially submitted by the Governor-General of Taiwan on October 5, 1912. Since the Draft contains a handwritten note stating “Approved by the Deliberation Council on August 15,” it is likely that the document was prepared around mid-August 1912.

Whereas the final version of the Gyogyō Kisoku consists of 24 articles, the Draft originally consisted of 26 articles, with red-ink annotations added by the Colonial Affairs Bureau. A comparison between the two texts reveals the following key points:

	Takusyoku Kyoku Revisions	Officially Enacted Gyogyō Kisoku
1	<p>第五条 漁業権ノ存続期間ハ免許ノ日ヨリ十年以内トシ台湾総督之ヲ定ム但シ第七条第一項ノ規定ニ依リ漁業ヲ停止セラレタル期間ハ之ヲ算入セス</p> <p>(加筆) 前項ノ期間ハ漁業権者ノ申請ニ依リ之ヲ更新スルコトヲ得</p>	<p>第五条 漁業権ノ存続期間ハ免許ノ日ヨリ十年以内トシ台湾総督之ヲ定ム但シ第七条第一項ノ規定ニ依リ漁業ヲ停止セラレタル期間ハ之ヲ算入セス</p> <p>前項ノ期間ハ漁業権者ノ申請ニ依リ之ヲ更新スルコトヲ得</p>
2	<p>第七条 水産動植物ノ蕃殖保護、船舶ノ航行碇泊数繁留、水底電線ノ敷設若ハ国防其ノ他(加筆)ノ軍事上必要アルトキ又ハ公益上害(加筆)必要アリト認ムルトキハ台湾総督ハ免許シタル漁業ヲ制限シ若ハ停止シ又ハ免許ヲ取消スコトヲ得</p> <p>前項ノ規定ハ漁業権者又ハ漁業権ノ貸付ヲ受ケタル者カ本令又(加筆)若ハ本令ニ基キテ発スル命令又ハ前条ノ制限若ハ条件ニ違反シタル場合ニ之ヲ準用ス</p>	<p>第七条 水産動植物ノ蕃殖保護、船舶ノ航行碇泊数繁留、水底電線ノ敷設其ノ他軍事上又ハ公益上必要アリト認ムルトキハ台湾総督ハ免許シタル漁業ヲ制限シ若ハ停止シ又ハ免許ヲ取消スコトヲ得</p> <p>前項ノ規定ハ漁業権者又ハ漁業権ノ貸付ヲ受ケタル者カ本令若ハ本令ニ基キテ発スル命令又ハ前条ノ制限若ハ条件ニ違反シタル場合ニ之ヲ準用ス</p>
3	<p>第八条 左ノ場合ニ於テハ台湾総督ハ其ノ免許ヲ取消スコトヲ得</p> <p>一 錯誤ニ因リ免許ヲ与ヘタルトキ</p> <p>二 免許ヲ受ケタル(加筆) 漁業権者又ハ漁業権ノ貸付ヲ受ケタル者免許ノ日ヨリ一年以内ニ漁業ニ着手スル者</p>	<p>第八条 左ノ場合ニ於テハ台湾総督ハ免許ヲ取消スコトヲ得</p> <p>一 錯誤ニ因リ免許ヲ与ヘタルトキ</p> <p>二 漁業権者又ハ漁業権ノ貸付ヲ受ケタル者免許ノ日ヨリ一年以内ニ漁業ニ着手セス又ハ着手後一年以上休業シタル</p>

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	ナキトキ (加筆) セス又ハ着手後一年以上休業シタルトキ	トキ
4	第十五条 台湾総督ハ水産業ノ改良発達ヲ図ル為水産会ヲ設置スルコトヲ得水産会ノ区域内ニ於ケル漁業者又ハ水産動植物ノ製造若ハ販売ヲ業トスル者ハ総テ水産會員トシ水産会ニ関シテハ台湾農會規則第二条、第三条第一項並第三項、第四条乃至第六条及第七条第一項ノ規定ヲ準用ス	
5	第十六 (加筆) 五条 (加筆) 漁場ノ区域漁業ノ方法又ハ漁業權ノ範圍ニ付漁業者ノ間ニ争アルトキハ関係者ノ申請ニ依リ台湾総督之ヲ裁決ス	第十五条 漁場ノ区域漁業ノ方法又ハ漁業權ノ範圍ニ付漁業者ノ間ニ争アルトキハ関係者ノ申請ニ依リ台湾総督之ヲ裁決ス
6	第十七 (加筆) 六条 免許ニ依ラス (加筆) シテ第三条ノ漁業ヲ為シタル者又ハ第六条若ハ第七条ノ規定ニ依ル制限 (加筆)、条件若ハ停止ニ違反シテ第三条漁業ヲ為シタル者ハ千円以下ノ罰金ニ処ス	第十六条 免許ニ依ラスシテ第三条ノ漁業ヲ為シタル者又ハ第六条若ハ第七条ノ規定ニ依ル制限、条件若ハ停止ニ違反シテ漁業ヲ為シタル者ハ千円以下ノ罰金ニ処ス
7	第十八 (加筆) 七条 第十三条第一項ノ規定ニ違反シタル者又ハ同条第二項若ハ第三項ノ規定ニ依ル制限 (加筆)、条件、停止若ハ禁止ニ違反シテ漁業ヲ為シタル者ハ三千円以下ノ罰金ニ処ス	第十七条 第十三条第一項ノ規定ニ違反シタル者又ハ同条第二項若ハ第三項ノ規定ニ依ル制限、条件、停止若ハ禁止ニ違反シテ漁業ヲ為シタル者ハ三千円以下ノ罰金ニ処ス
8	第十九 (加筆) 八条 前二条ノ犯罪行為ニ供シタル漁具及之ニ因リ得タル漁獲物ハ之ヲ没収ス其ノ全部又ハ一部ヲ没収スルコト能ハサル場合ニ於テハ其ノ価格ニ相当スル金額ヲ追徴ス 前項ノ漁具犯人以外ノ者ニ属スルトキハ行政処分ヲ以テ之ヲ没収スルコトヲ得	第十八条 前二条ノ犯罪行為ニ供シタル漁具及之ニ因リ得タル漁獲物ハ之ヲ没収ス其ノ全部又ハ一部ヲ没収スルコト能ハサル場合ニ於テハ其ノ価格ニ相当スル金額ヲ追徴ス 前項ノ漁具犯人以外ノ者ニ属スルトキハ行政処分ヲ以テ之ヲ没収スルコトヲ得
9	第二十 (加筆) 十九条	第十九条
10	第二十一条 第十四条ノ規定ニ依ル職務ノ執行ヲ拒ミ (加筆)、若ハ (加筆) 之ヲ妨ケタル者又ハ臨検搜索ノ為ニスル訊問 (加筆) 若ハ忌避シ又ハ当該官吏ノ尋問ニ対シ答弁ヲ為サス若ハ虚偽ノ陳述ヲ為シタル者ハ三百円以下ノ罰金又ハ科料ニ処ス	第二十一条 第十四条ノ規定ニ依ル職務ノ執行ヲ拒ミ、之ヲ妨ケ若ハ忌避シ又ハ当該官吏ノ尋問ニ対シ答弁ヲ為サス若ハ虚偽ノ陳述ヲ為シタル者ハ三百円以下ノ罰金又ハ科料ニ処ス
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Conclusion

The annotations found in the Draft clearly show that many of the proposed changes by the Takusyoku Kyoku were reflected in the final version of the enacted Gyogyō Kisoku. This indicates the significant influence the Takusyoku Kyoku had on the formation process of the regulations.

Furthermore, it can be confirmed that the Bureau instructed the removal of Article 15, concerning the establishment of Fisheries Associations in Taiwan, and a clause in the supplementary provisions treating organizations approved by Taiwan's administrative authorities as equivalent. This suggests an intent to suppress elements of local self-governance in fisheries administration in colonial Taiwan.

In this way, this paper has approached the Gyogyō Kisoku—not merely from the internal circumstances of Taiwan as has often been the case in previous studies—but rather from an external perspective that examines how Imperial Japan sought to govern fisheries in its colonies. This analysis has thus shed light on one aspect of the intentions behind the formation of colonial fisheries governance.

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The Wind Lion Belief in Coastal Minnan Society: A Case Study of the Wind Lion Gods in Kinmen

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Abstract

Lions were introduced to China via the overland Silk Road during the Han dynasty and later through the Maritime Silk Road during the Song and Yuan dynasties, reaching the southeastern coastal regions. As the “King of Beasts,” the lion is believed to possess an imposing presence that wards off evil spirits and malevolent forces, preventing them from causing harm. Consequently, lions came to be regarded as auspicious symbols in Chinese culture and gradually evolved into spiritual creatures that repel evil and bring blessings. Due to their diverse appearances—sometimes majestic, sometimes playful—lions became popular and widespread guardian deities in the Minnan (Southern Fujian) region. This paper explores the transformation of the lion’s image and function in China, using the Wind Lion God belief on Kinmen Island, located in the Minnan region, as a case study to examine the dissemination and influence of lion-related folk beliefs.

Keywords: coastal society, Kinmen, Minnan region, stone lion belief, Wind Lion God

Introduction

Records of lions in China can be traced back to the pre-Qin period, as seen in texts such as *The Tale of King Mu* (*Mu Tianzi Zhuan*) and *Erya*, which mention a creature called the “Suanni” (狻猊). The Suanni was described as a type of beast, with numerous references in ancient Chinese literature (Fig. 1). From these records, it can be inferred that the Suanni had a lion-like appearance and was considered a powerful and fierce animal, capable of subduing tigers and leopards, and capable of traveling 500 li in a day.

Lions were introduced into China from the Western Regions via the overland Silk Road during the Han Dynasty. Thus, it is generally believed that Chinese lion culture originated in the Han period. Later, from the Song and Yuan dynasties onward, lions also entered the southeastern coastal areas via the Maritime Silk Road.

Lions, known as the “King of Beasts,” were believed to possess a majestic presence capable of warding off evil spirits and malevolent forces, preventing them from causing harm. As a result, lions came to be seen as auspicious symbols in China and gradually evolved into

spiritual guardians that could dispel evil and attract blessings. Stone lion sculptures (commonly referred to as “stone lions”) became widely used talismans against evil, and can be found wherever Chinese communities are located—in temples, businesses, archways, and other places—making them iconic religious and cultural symbols.

Through a long process of “Sinicization,” the image of the lion gradually evolved from that of a mythical beast into a culturally Chinese symbol. Initially, lions were rare foreign tributes, seen only by members of the royal family or high-ranking officials, and thus held an air of mystery, nobility, and authority. However, as records and oral traditions spread, and through the visual representation in paintings and artworks, the lion’s role and meaning began to shift. It gradually became a guardian deity protecting villages and households, eventually becoming an important part of Chinese folk belief, with its image growing more accessible and familiar to the public. As a result, lion worship and lion culture became increasingly widespread.

This paper first aims to outline the lion’s image and function based on ancient texts, and then, using the example of the Wind Lion God (*Fengshiye*) tradition in Kinmen, explores the spread and influence of lion culture in coastal Minnan (Southern Fujian) society.



Fig. 1. “Suanni” illustrated by a Ming Dynasty artist.

Source: Official website of the Southern Branch of the National Palace Museum, Taiwan

The Cultural Functions and Symbolism of the Lion

According to Chinese classical literature, the functions and cultural symbolism of the lion can be broadly categorized into four types:

- 1) A symbol of exchange and trade: Lions were introduced into China through trade routes such as the overland and maritime Silk Roads, as well as through diplomatic tribute. As a result, they became symbols of cultural exchange between China and foreign regions.

- 2) The lion as a divine beast: In Daoist belief, Mount Kunlun is considered a sacred mountain inhabited not only by immortals but also by numerous divine beasts. Among them, lions or lion-like creatures are the most representative, enriching the mythology of ancient China.
- 3) A symbol of authority and nobility: Initially introduced as exotic tribute animals, lions were primarily kept in royal gardens. Consequently, they came to symbolize the majesty and noble status of the imperial family.
- 4) A Buddhist symbol: In ancient India, the lion was regarded as a symbol of royal power and of the Buddha himself. The image of the lion as a guardian figure became part of Buddhist tradition after Buddhism was introduced into China during the Han dynasty.

The Wind Lion God Culture in Kinmen

On Kinmen Island, located along the coastal region of southern Fujian (Minnan), a unique form of lion culture has developed—the belief in the Wind Lion God (*Fengshiye*). Due to the island’s exposure to strong, cold northeastern monsoon winds in the winter, as well as the impacts of natural disasters and warfare, residents began installing stone lion statues throughout the island to ward off wind and evil spirits. The Wind Lion Gods are considered by Kinmen residents as the first line of spiritual defense protecting the outer boundaries of their villages, serving as key talismans against malevolent forces. Similar lion-based protective customs can also be found in nearby regions such as Zhangzhou and Quanzhou in southern Fujian.

In local folk belief, the Wind Lion God is an important deity. Its image typically features the Chinese character “王” (meaning “king”) carved on the forehead, symbolizing the lion’s status as the king of beasts and its power to dispel evil. Over time, the Wind Lion God was incorporated into geomantic practices (*feng shui*), with different placement locations and orientations giving rise to various functions, such as protecting against wind damage, preventing termite infestations, and warding off malevolent spirits—ultimately contributing to a stable and peaceful life for the community.

The Wind Lion Gods can be categorized into three types: village-type, wall/ridge-type, and decorative-type. Among these, the village-type Wind Lion Gods are the most numerous, with approximately 68 statues. Altogether, there are over 100 Wind Lion statues of all types across Kinmen.

Since Kinmen opened to tourism, the Wind Lion God has been shaped into a key cultural symbol of the island and gradually commercialized for tourism. Initiatives such as the “Searching for Wind Lion Gods” sightseeing bus tour, airline promotions like the “Kinmen Wind Lion God Project,” and events such as the “Sorghum, Old Streets, and Wind Lion God

Cultural Festival” have all contributed to its prominence. In addition, a wide range of cultural and creative merchandise featuring the Wind Lion God has been developed, making it a distinctive and iconic symbol of Kinmen’s cultural identity.

Through the reinterpretation of various tourism products and artworks, the Wind Lion God—despite the diminishing of its original religious and *feng shui* functions—continues to hold significant value as a cultural symbol. It has been rebranded as a cultural representative of Kinmen, serving not only as a medium for local identity but also as a valuable cultural asset that attracts tourists (Fig. 2).



Fig. 2. Various statues of Wind Lion Gods on Kinmen Island.

The Cultural and Creative Imaginations of Shuitou Settlement in Kinmen

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Abstract

Since the termination of Kinmen's military mission in 1992, the authorities have actively promoted tourism on the island. Kinmen possesses a rich and diverse Minnan culture, diaspora culture, and military heritage, all of which constitute its local distinctiveness and indeed attract a considerable number of young travelers for in-depth cultural experiences. Taking Shuitou settlement as an example, this study translates pediment decorative motifs of Western-style houses that embody the diaspora culture, and subsequently designs three types of cultural and creative products. The objective is to contribute to the development of both the tourism and cultural-creative industries of Shuitou settlement thereby fulfilling the university's social responsibility.

Keywords: diaspora culture, pediment, Shuitou in Kinmen, university's social responsibility, Western-style houses

Introduction

In recent years, the concept of "littoral society" has become a subject of scholarly interest in Taiwan. Various dimensions such as cultural industries, cultural-creative industries, regional revitalization, and Fishermen's life-world have yielded notable research results. The author has primarily conducted fieldwork and literature analysis in fishing villages and coastal settlements to trace local historical trajectories and identify maritime cultural elements, which were then translated into various forms of cultural and creative imagination. Examples include Baduzi and Heping Island in Keelung, Mao'ao fishing village in Gongliao District of New Taipei City, and Qiaozai and Chenggong fishing villages in Kinmen.

Kinmen is renowned for its rich and diverse Minnan culture, diaspora culture, and military heritage. Among its many settlements, Shuitou is particularly distinguished by its Minnan and diaspora cultural characteristics, with the latter being especially prominent. Located in the southwest corner of Jincheng Township, Shuitou is a multi-surname settlement dominated by the HUANG clan. Historically, it served as a crucial transportation hub between Kinmen and Xiamen. Once a wealthy community, it is home to the largest and most refined collection of Minnan-style architecture and Western-style houses on the island. The Kinmen proverb, "*It is easy to have Shuitou's wealth, but difficult to have Shuitou's houses,*" underscores the prestige and aesthetic recognition Kinmen people attributed to Shuitou's

architecture. This paper focuses on Shuitou's diaspora culture as a coastal settlement and through fieldwork, literature analysis to translate different cultural-creative imaginations.

Diaspora Culture of Shuitou

Western-style houses

Historically, Shuitou served as a vital port of transit between Kinmen and Xiamen. Migration routes of Kinmen's early settlers typically passed through Xiamen, Lieyu, and Shuitou before dispersing across Kinmen for land reclamation and settlement. Later, as Kinmen people ventured to Southeast Asia in search of livelihood opportunities, Shuitou became an important point of departure. Many overseas Kinmen people who achieved success abroad returned to their hometown in Shuitou, making donations to local construction and building Western-style houses as symbols of success.

The emergence of these houses reflected the desire of overseas Kinmen people to express their rising social status through distinctive architectural vocabularies. Influenced by the colonial architecture of the British and French in Southeast Asia, they brought back blueprints, paintings, or photographs and instructed local craftsmen to adapt and reinterpret them, blending foreign features with local traditions. Thus, emerged Western-style houses with distinctive Kinmen characteristics.

The integration of Southeast Asian architectural styles into Shuitou settlement began around 1916. Returnees fused colonial elements with Minnan traditional architecture, initiating the construction of Western-style houses. From 1926, two-story designs appeared, and by 1931, complete Western-style houses had been established.

Following the termination of Kinmen's military mission in 1992, the authorities designated one-fourth of the island's land—covering 3,780 hectares, including 13 traditional settlements such as Shuitou—as Kinmen National Park. Shuitou now possesses the largest number of Western-style houses on the island. Among these, six houses are notable for their decorated pediments in Western style, with the Huang Huihuang Western-style house being the most renowned due to its early construction and particularly rich decorative motifs of pediment (Fig 1).



Fig. 1. Huang Huihuang Western-style house with rich decorative motifs of pediment.

Decorative motifs on pediment

The decorative motifs on pediment can be categorized into five groups—figures, animals, plants, objects, and inscriptions—while stylistically they fall into three types: traditional, Western, and Southeast Asian.

- Traditional themes: ancestral hall names, house names, construction dates, couplets, books, lanterns, vases, dragons and phoenixes, qilin, peacock displays, carps, rabbits, ao fish, lotus, bamboo, peony, pumpkins, crabs, bats, longevity peaches, paired lions playing with balls, and the Blue Sky with a White Sun emblem.
- Western themes: construction dates, house owners' names, angels, globes, shields, lanterns, vases, stereoscopes, eagles, lions, Southeast Asian lion-dogs, Pegasus, clocks, elephants, Indian ceremonial soldiers, Indian coolie figures, roses, wheat ears, acanthus leaves, pineapples, grapes, English proverbs, meanders, stars, and geometric patterns.
- Southeast Asian themes: Indonesian mythological beasts, Southeast Asian lion-dogs, Indian ceremonial soldiers, and Indian coolie figures.

Cultural and Creative Imaginations

According to LIN Yanzhou's survey of Kinmen's tourist demographics, visitors are almost evenly divided by gender (male: 49.65%, female: 50.35%). In terms of age: 10.45% are under 20, 26.88% are 21–30, 22.14% are 31–40, 22.84% are 41–50, 15.88% are 51–60, 1.53% are 61–70, and 0.28% are over 71. Nearly half (49.02%) are between 21 and 40 years old, comprising the largest group. Consequently, the cultural-creative products designed in this study target this demographic.

Of particular interest are the decorative motifs on pediments and eaves that symbolize "*Many children and grandchildren*," such as angels, lanterns, carps, rabbits, pumpkins, pineapples, grapes, and sponge gourd. Although Taiwan's birth rate continues to decline, many couples still aspire to have children. In addition to worshipping deities such as Zhusheng Niangniang (Goddess of Childbirth) and Guanyin holding a child, they often purchase fertility-related charms or products. Thus, two cultural-creative products were designed under the theme of fertility: a sponge gourd-shaped extension cord and a pineapple pendant containing seeds (Fig. 2).

In addition, the author was inspired by the diverse tile patterns in Shuitou's Western-style houses. By combining these with decorative motifs on pediment, cultural-creative products such as bookmarks and small wooden pendants engraved with auspicious phrases were designed. From left to right, the phrases signify: "*Many Children and Grandchildren*" (fertility), "*Eternal Health and Peace*" (health), "*embark on a grand undertaking*" (career), and "*Reading Brings Benefits*" (scholarship). The patterns below them are the different types of tiles in the Western-style houses (Fig. 3).

Conclusion

Since the termination of Kinmen's military mission in 1992, the authorities have actively promoted tourism on the island. Kinmen's rich and diverse Minnan culture, diaspora culture, and military heritage constitute its local distinctiveness and have indeed attracted many young travelers for in-depth cultural experiences. Taking Shuitou village as an example, this study designed three types of cultural-creative products, aiming to contribute to the development of tourism and creative industries in Shuitou village while fulfilling the university's social responsibility.

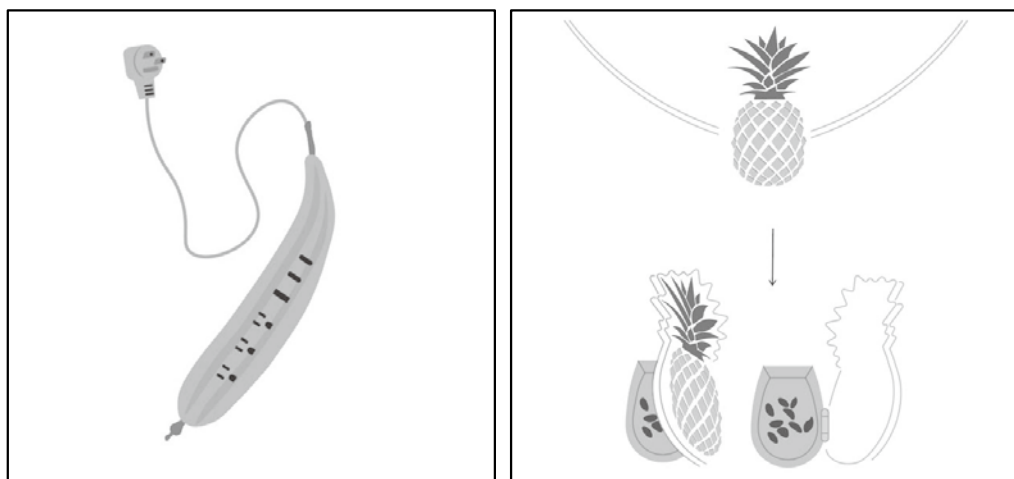


Fig. 2. A sponge gourd-shaped extension cord (left) and a pineapple pendant containing seeds (right) designed by WANG Chun-Chang and WANG Chen-Wei.

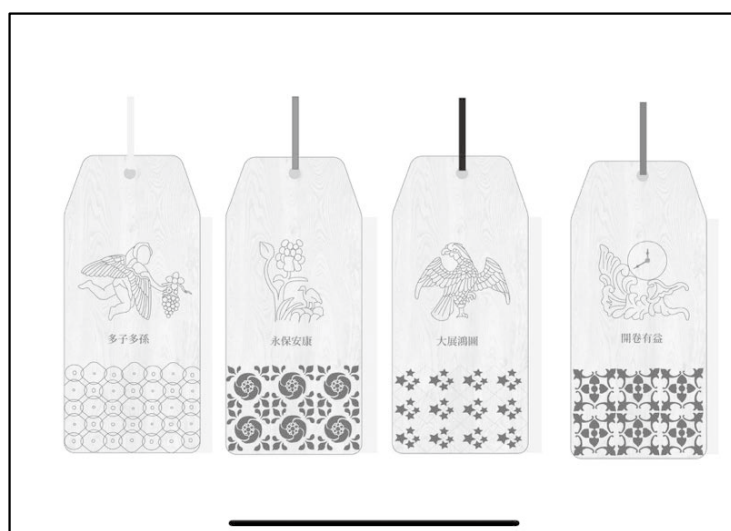


Fig. 3. Bookmarks and small wooden pendants engraved with auspicious phrases designed by WANG Chun-Chang and TSENG Jou.

Constructing Island Images: Moving Beyond Isolation and Stigma

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Abstract

This study explores how local branding initiatives in the southwestern archipelago of South Korea help overcome negative perceptions of islands, traditionally associated with isolation and underdevelopment, by fostering new regional identities. Using the case of Purple Island in Sinan County, it demonstrates how collaboration between government agencies and local residents successfully redefined the island's image. Furthermore, it introduces how local branding, through the use of storytelling and cultural resources, can transform marginalized island communities into vibrant cultural and economic hubs. Through strategic branding, Sinan County sought to overcome the long-standing stigma attached to island communities, demonstrating that local branding can serve as a means of fostering broader social recognition and inclusion. This highlights that islands are not merely geographical spaces but are deeply intertwined with human experience, culture, and history.

Keywords: periphery, place identity, recognition, regional identity, stigma

This study examines local branding initiatives in the southwestern archipelago of South Korea, focusing on how they transform islands traditionally associated with isolation, disconnection, and underdevelopment into vibrant and attractive communities. Branding functions not only as a promotional strategy but also as a powerful tool for preserving cultural values, fostering social recognition, and reshaping regional identity.

Sinan County, long stigmatized as a place of exile and perceived as underdeveloped and remote, has faced deeply entrenched negative perceptions. Due to the exclusivity and closed nature often attributed to islands, certain events were amplified into broader discourses, reinforcing external stereotypes. Even minor negative incidents contributed to the persistence of such perceptions, forcing ordinary residents to live under a social stigma. These negative images weakened the tourism industry, reduced seafood sales, and ultimately harmed the local economy.

More importantly, attachment to one's region enhances happiness and life satisfaction while strengthening trust in social institutions. However, when the misconduct of a few individuals led to collective stigmatization, community members lost their sense of belonging, and local vitality gradually declined.

In response, Sinan County pursued two major strategies to revitalize its image. First, it redefined the number of islands to 1,004 and promoted the idea of the “Island of Angels,” leveraging the homonym in Korean between the number 1,004 and the word “angel” (*cheon-sa*). This symbolic rebranding was applied to government logos, signs, and trademarks, creating a unified positive image that gained nationwide recognition.

Second, the county introduced flower-based themes and color marketing, designating distinct colors and floral symbols for each island (Table 1). By linking these with storytelling, they sought to transform the image of islands from isolated and closed-off places into bright, open, and attractive destinations.

Although unexpected incidents again threatened Sinan’s image—particularly through rapid negative diffusion on social media that led to a decline in younger tourists—the color marketing initiative provided an alternative path. By integrating unique local stories, natural resources, and cultural heritage, Sinan developed customized brands for each island. The process was not without conflict, as differing opinions among residents created friction, but such debates ultimately contributed to building new collective identities. Importantly, young people and residents themselves took ownership, organizing cooperatives and working alongside local authorities to realize the vision of islands where people would want to visit, live, and stay.

Through these strategies, Sinan County sought to overcome the longstanding stigma attached to island communities, demonstrating how local branding can serve as a means of fostering social recognition and inclusion. Furthermore, this study analyzes how residents develop and utilize local resources to construct new collective identities, and how islanders adopt and consume new images as a way of restoring their social identity.

Table 1. Status of theme-based island flower festivals in Sinan County.

Region	Flower Type	Festival Period	Region	Flower Type	Festival Period
Imjado	Red Plum Blossom	February	Jeungdo	Thysanostemon	*
	Tulip	April	Byeongpungdo	Cockscomb	Sep ~ Oct
Seondo	Narcissus	March	Jido	Lilac	Summer
Docho-do	Hydrangea	June	Bigeumdo	Rosa rugosa	*
Purple Island (Banwol & Bakji-do)	Lavender	May	Jaeundo	Calanthe	April
	Verbena	Jun~ Aug	Shini-do	Myrica rubra	*
	Aster	Sep ~ Oct	Hau-do	Rose of Sharon	*
Aphaedo	Camellia japonica	Dec~ Jan	Palgeumdo	Rapeseed Flower	April
	Crocsmia	July		Mulberry	*
Goido	Azania	November	Hongdo	Daylily	July

(* indicates festivals that have not been held yet)

The Transoceanic Spread of Chinese Celadon Art to the East

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Abstract

In the 9th century, Zhang Baogao brought Chinese porcelain craftsmen from Zhejiang to the Korean Peninsula, and the Chinese porcelain-making technique was spread to the Gangjin-gun in Jeollanam-do of South Korea. Therefore, early Goryeo celadons were influenced by Chinese kilns such as the Yue Kiln, emulating Chinese forms. In the mid-10th century, the Wuyue Kingdom presented secrete color celadon as a gift to the royal family of Japan. The sailing route started from Mingzhou, crossed the East China Sea directly, reached the southwestern coast of Kyushu, and finally arrived in Kyoto via Hakata Port. These secrete color celadons influenced the development of Japanese porcelain-making techniques. Chinese celadon art was spread along the sailing route between Mingzhou and Hakata, as an important highlight of the Maritime Silk Road in East Asia. Also, it constituted an important chapter in the ancient cultural exchanges among China, Japan, and South Korea.

Keywords: celadon art, China, the maritime silk road, the Sailing route between Mingzhou and Hakata

The Development and Brilliance of Zhejiang Celadon

As the birthplace and main producing area of Chinese celadon, Zhejiang has a long history of celadon firing, which can be traced back to the Dongtiaoxi River Basin in northern Zhejiang over 3,000 years ago. From the emergence of proto-porcelain to the glory of famous kilns such as the Yue Kiln and Longquan Kiln, Zhejiang celadon holds a pivotal position in ceramic history.

During the flourishing Tang and Song dynasties (960-1279), Yue Kiln celadon reached its zenith. In the late Tang Dynasty, the successful firing of secret-colored porcelain marked a new height in porcelain-making techniques, achieving advancements in both color and texture (Fig. 1, 2). The kiln industry in Zhejiang progressively developed, centered around Shanglin Lake, with additional contributions from Dongqian Lake in Ningbo and the Cao'e River Basin in Shangyu. This extensive network encompassed the Ningbo-Shaoxing area, initiating the historical era of Zhejiang tribute porcelain.

The Song dynasties stand as the golden age of ancient celadon craftsmanship in Zhejiang. Building on the legacy of the Yue Kiln and integrating foreign techniques, the Longquan Kiln and Southern Song imperial Kiln pioneered exquisite opalescent-glazed celadon works that rivaled the finest productions of other master kilns during the Song era. Their craftsmanship, defined by thin bodies and thick glazes, attained extraordinary levels of sophistication, with powder-blue glazed celadon emerging as the new paragon of quality.

As the Yue Kiln and Ou Kiln gradually declined, the Longquan Kiln rose to prominence in the mid-Northern Song dynasty and continued to flourish throughout the Yuan dynasty (1271-1368). With its dual-core distribution spanning southwestern Zhejiang and the Oujiang River Basin in southern Zhejiang, the Longquan kiln produced an extensive variety of celadon wares that pushed celadon craftsmanship to unprecedented heights, standing as the ultimate pinnacle of ceramic artistry in that era.

The celadon craftsmanship of Zhejiang has maintained an unbroken lineage for millennia, evolving into an enduring intangible cultural heritage. In 2009, UNESCO inscribed this time-honored tradition on the Representative List of the Intangible Cultural Heritage of Humanity, marking it as the world's first ceramic art form to earn such global recognition.

The Eastward Transoceanic Spread of Celadon

The porcelain-making techniques of Yue Kiln celadon were introduced to the Korean Peninsula during the Five Dynasties and Ten Kingdoms period. During the late Silla Dynasty (668–935), Zhang Baogao, the ambassador of Cheonghaejin, brought Yue Kiln craftsmen from Zhejiang to the Korean Peninsula—specifically to Gangjin-gun in Jeollanam-do—thus facilitating the spread of Chinese porcelain craftsmanship to these regions (Fig. 3). By the end of the 9th century, Goryeo celadon produced on the peninsula bore distinct influences from Chinese kilns such as the Yue Kiln, with numerous pieces emulating Chinese stylistic motifs and forms.



Fig. 1. Yue Kiln Celadon Site (Late Tang Dynasty) in Hehuaxin, Qiaotou Town, Cixi City, Zhejiang Province, China.



Fig. 2. Yue Kiln secret-color porcelain octagonal pure vase, collection of the Palace Museum, China.



Fig. 3. Koryo Celadon Kiln Site in Yongun-ri, Daegok-myeon, Gangjin, South Korea.



Fig. 4. “Sangnyakguk” (Imperial Pharmacy Bureau) Inscribed Celadon Box, National Museum of Korea.

The arrival of Yue Kiln craftsmen enabled the region to transition from the pottery age to the porcelain age in a relatively short period, thus initiating the history of porcelain firing in Korea. After learning porcelain-making techniques from Yue Kiln craftsmen, the main varieties of celadon produced by Goryeo artisans include jade-green celadon and inlaid celadon (Fig. 4).

During the period of Five Dynasties and Ten Kingdoms, the Wuyue Kingdom presented secrete color celadon as state gift to the royal family of Japan. The sailing route started from Mingzhou, crossed the East China Sea directly, reached the southwestern coast of Kyushu, and finally arrived in Kyoto via Hakata Port.

In May 1975, a sizeable collection of Chinese celadon was discovered from the waters off Sinan, South Korea—uncovering the “Sinan Shipwreck,” which dates to 1323 in the Yuan Dynasty. From 1976 to 1984, South Korea archaeologists conducted excavations on the sunken vessel and ultimately salvaged it ashore. Over 20,000 pieces of celadon and white porcelain were unearthed from this Yuan-Dynasty Chinese shipwreck. South Korea constructed a museum in Mokpo to exhibit the Sinan Shipwreck and its cultural relics (Fig. 5). The porcelain artifacts from the Sinan Shipwreck, primarily wares from Zhejiang’s Longquan Kiln, are prized not only for their abundance but also for their exceptional quality. They are remarkably well-preserved and can be considered fine examples of Yuan Dynasty porcelain (Fig. 6, 7).



Fig. 5. The Sinan Shipwreck exhibited in Mokpo, South Korea.



Fig. 6. Exhibits of Cultural Relics Salvaged from Sinan Shipwreck at Mokpo Museum, South Korea.



Fig. 7. Porcelain Wares salvaged from the Sinan Shipwreck.

Sea Routes for the Eastward Spread of Celadon Art

The coastal region of eastern Zhejiang is defined by its flat terrain. Mingzhou, now known as Ningbo, faces the Zhoushan Islands and is laced with an intricate river network. The upper reaches of the Yao River connect to the Grand Canal, while the region links northward to the Yangtze River and eastward to overseas destinations. Rooted in the economic hinterlands of western Zhejiang, northern Zhejiang, and the Yangtze-Huaihe River Basin,

these geographical features afford it favorable conditions for the development of maritime navigation.

East of Mingzhou, the Kuroshio flows powerfully around the Zhoushan Islands. Riding this current, a crossing of the East China Sea typically took 7 days to reach Japan and 10 days to reach Goryeo. During the prosperous periods of the Tang, Song, and Yuan dynasties, Mingzhou supplanted northern ports as the primary harbor for voyages to Japan and the Korean Peninsula.

The sea route, with Ningbo and Hakata in Japan serving as paired gateways and the Zhoushan and Goto Islands acting as connecting “bridges,” forms the central axis of East Asia’s Maritime Silk Road (Fig. 8). North of this central axis lies the maritime route from Dengzhou in Shandong to the west coast of the Korean Peninsula; to the south, routes link southern Jiangsu, eastern Zhejiang, and Ryukyu. Collectively, they constitute the maritime network of East Asia.

The compass route for the “Sea Vessel Route” should essentially align with that recorded in Xu Jing’s “*Goryeo Tujing*” (An Illustrated Account of Goryeo) from the Song Dynasty. Xu Jing’s compass route is divided into three segments, as follows:

The first segment entails exiting Chinese territory: departing from Mingzhou, heading out to sea, and passing Meicen (now Putuo Mountain) to enter the open ocean. This leg took roughly 11 days.

The second segment entails crossing the open ocean: departing from Banyang Reef and passing through Baishui Ocean, Huangshui Ocean, and Heishui Ocean, this leg took roughly 3 days.

The third segment entails entering Goryeo territory: traveling from Gappye San to Iseong Port, this leg took roughly 12 days.

Following this compass route, the large fleet organized by the diplomatic mission, consisting of “two divine ships and six guest ships” led by Xu Jing, completed the outward journey downstream in only 26 days, while the return journey upstream took 42 days in total.

After celadon became globalized, it exerted a positive and far-reaching influence on the dissemination of Chinese culture. It showcases to the world the profoundness and unique charm of ancient Chinese culture, as well as its aesthetic concepts characterized by reservedness, elegance, and lingering charm, along with its profound cultural heritage. Therefore, the cultural value carried by celadon has contributed a unique strength to promoting the diversified development of human civilization.



Fig. 8. East Asia’s Maritime Silk Road.

The Ancient Tea-Boat Road: An Investigation into the Lineal Cultural Heritage of the Northern Fujian Section

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Abstract

The Ancient Tea-Boat Road is a linear cultural heritage settlement with distinct regional characteristics. Originating in Fujian, it connects the Maritime Silk Road through waterways and South China Sea routes. The Ancient Tea-Boat Road combines transportation routes with heritage themes, forming a trade route. From an overall cultural route perspective, protecting and effectively utilizing the cultural relics along The Ancient Tea-Boat Road constitutes an integrated conservation strategy.

Keywords: the Ancient Tea-Boat Road, the lineal cultural heritage

The Ancient Tea-Boat Road is a trade-route paradigm whose commercial diffusion is largely confined to Fujian Province. It constitutes a heritage type defined by the conveyance of tea along fluvial and littoral corridors. As a linear cultural heritage, the route is articulated by four inland waterways—the Min, Jin, Ting, and Jiulong Rivers—together with the South China Sea shipping lane. Each segment is structurally homologous: a chain of montane hinterlands successively articulated with riverine arteries, all oriented toward tea as the dominant commodity. Although the four lines function independently, they coalesce into an integrated whole. The Tea-Boat Road forms an intrinsic component of maritime cultural heritage, operating as the terrestrial-marine interface for provisioning and circulation along the Maritime Silk Road. Over time, tea, vessels, and ancillary commodities have crystallized into salient constituents of the oceanic cultural legacy.

In 1996, HAYASHIYA Seizō, former Deputy Director of the Tokyo National Museum and a leading Japanese archaeologist, led a delegation to Dongfeng. Upon examining the “Chiseled Cliff Inscriptions (凿字岩)” that document the region’s tea history, he concluded that Beiyuan Tea epitomized the pinnacle of imperial Chinese tea craftsmanship, and that its underlying tea culture profoundly influenced the formation of Japanese Chanoyu (the Way of Tea). Deeply moved by this realization, HAYASHIYA personally donated two million yen toward the conservation of these cliff-face inscriptions.

The northern Fujian segment of the Tea-Boat Road originates in the Wuyi Mountains, encompassing the tea-producing regions of southern Zhejiang and eastern Jiangxi. It utilizes

the Min River as its primary waterway, terminating at Fuzhou Port, which serves as a critical transshipment hub connecting the key ports of Fujian, Zhejiang, Jiangxi, and Guangdong. From Fuzhou, the route integrates into the maritime corridors of the Maritime Silk Road, extending to global markets. The Min River's main channel flows through Fuzhou City before emptying into the East China Sea, and via Fuzhou Port, tea cargoes historically sailed south to Guangzhou, also calling at Quanzhou, Zhangzhou, and other major coastal entrepôts. For over a millennium, the Tea-Boat Road has thus provided uninterrupted inland-sea connectivity to the Maritime Silk Road.

Following the Song Dynasty, Fujian tea experienced recurrent cycles of prosperity and decline. Taking Wuyi tea as a paradigmatic example:

Yuan Dynasty: Wuyi tea's exclusive tribute status to the imperial court elevated it to national renown.

Early Ming: The tribute burden led to its decline.

Mid-Ming: The invention of Lapsang Souchong (Xiao-Zhong hongcha) spurred a revival.

Mid-Qing: Coarser Souchong lost market share to more refined Gongfu black teas.

Late Qing–Early Republican Era: Wuyi rock-essence tea (Yancha) briefly restored Wuyi tea's prestige, only for this efflorescence to be swiftly submerged beneath the turbulent tides of political chaos.

Thus, Wuyi tea underwent three complete cycles of ascent and eclipse.

Against the backdrop of tea trade's dramatic ebbs and surges, the Tea-Boat Road likewise underwent successive phases of expansion and contraction. In the upper Min River basin, the transport network was organized into two complementary modalities:

Overland Routes:

Trans-provincial corridors to Jiangxi and Zhejiang.

Short-haul cartage from production sites to riverside entrepôts.

Waterborne Transport:

Upper Min tributary navigation via the Futun, Jian, and Sha Rivers above Nanping.

Downstream haulage from Nanping to Fuzhou, the provincial capital.

The Five Cultural Significances of Classical Chinese Maritime Literature

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Abstract

In classical Chinese literature's writings about the sea, there are five major cultural significances. First, the "significance of an ideal world," shaped by the pursuit of transcendence and the search for mortal realms. Second, the "significance of rich imagination," brought by wondrous creatures and otherworldly realms. Third, the "significance of expressing emotions and aspirations," molded through tender feelings and heroic ambitions. Fourth, the "significance of philosophical reflection," conveyed by discussing great principles and using maritime metaphors to mirror life. Fifth, the "significance of narrative about everyday life," encompassing depictions of people's livelihoods, record travels, and portray beautiful landscapes. Together, these five layers of meaning give classical Chinese maritime literature an important and profound cultural role within Chinese maritime culture.

Keywords: classical Chinese maritime literature, cultural significance

The Significance of an Ideal World Beyond the Seas: Floating on a Raft and Seeking Immortal Realms

Confucius (551–479 B.C.) once conveyed his longing for an ideal world beyond the seas through the notion of "floating on a raft." In *The Analects* 論語 (Gongye Chang 公冶長), he famously stated:

"If the Way fails to prevail, I will float on a raft upon the sea."

According to the Song dynasty scholar Xing Bing (932–1010), this remark reflects Confucius' intent to cross the seas and reside among the "Nine Barbarians 九夷" should his moral teachings fail to find acceptance in China, thus continuing to practice his ideals. Whether the "sea" mentioned by Confucius referred to a specific geographic location or served merely as a metaphor remains indeterminate. Nonetheless, this gesture of entrusting aspirations to the sea—potentially as a form of retreat from worldly affairs—established a literary paradigm in subsequent maritime writings. Consequently, the phrase "floating on a raft upon the sea" evolved into a quintessential maritime symbol.

The concept of an ideal world beyond the seas also materialized in visions of immortal realms, epitomized by the myth of the Five Immortal Mountains in the Eastern Sea. As described in *Liezi* 列子 (Tang Wen 湯問):

"Countless millions of miles east of the Bo Sea 渤海 lies a great abyss, the bottomless valley known as Guixu 歸墟. All waters under heaven converge into it without causing rise or fall.

Within this abyss stand five mountains: Daiyu 岱輿, Yuqiao 員嶠, Fanghu 方壺, Yingzhou 瀛洲, and Penglai 蓬萊. Each mountain spans thirty thousand miles in circumference and nine thousand miles across at the summit, separated by seventy thousand miles as if neighboring islands. Atop them, pavilions of gold and jade glisten; birds and beasts of pure white dwell; forests of pearl and jade flourish, bearing fruits that bestow immortality. The residents are all sages and immortals, soaring freely day and night in uncountable numbers.”

This depiction—featuring sacred peaks, immortal beings, elixirs of eternal life, white mythical creatures, and splendid palaces—laid the archetypal foundation for later myths centered on Penglai and similar fairylands, thus embodying the cultural significance of an ideal world.

The Significance of Imagination: Extraordinary Life Forms and Otherworldly Realms

In Chinese classical literature, overseas realms are often imagined as domains of fantastical life forms and uncanny geographies. For instance, the *Classic of Mountains and Seas* 山海經 (*Northern Mountains* 北山經) recounts the legend of Jingwei 精衛:

“On Mount Fajiu 發鳩, among many mulberry trees, dwells a bird shaped like a crow, with a patterned head, white beak, and red feet, named Jingwei. Formerly, she was Nuwa 女娃, daughter of the Flame Emperor 炎帝, who drowned in the Eastern Sea. Transformed into Jingwei, she now eternally carries stones and twigs from the Western Mountains to fill the Eastern Sea.”

In this myth, the sea simultaneously serves as the site of Nuwa’s demise and her transcendence through rebirth as Jingwei. The dual symbolism of death and transcendence coexists within the same maritime space, highlighting a process of transformation—from victim to defiant hero, from fear to conquest—all culminating in the ocean as a space of vitality and spiritual rebirth.

Further examples of imagined otherworldly realms include the Valley of Tang 湯谷 and the Fusang 扶桑 tree, as recorded in the *Classic of Mountains and Seas* (*Eastern Overseas Lands* 海外東經):

“Above the Valley of Tang grows the Fusang tree, where the ten suns bathe. North of the land of the Black Teeth, it rises from the water; nine suns rest on its lower branches, while one perches on the top.”

This narrative envisions a cosmic geography where the cycles of the sun intertwine with a colossal tree rooted in distant seas.

The Significance of Emotional Expression: Tender Sentiment and Heroic Aspiration

Within literary works, the sea frequently becomes a medium through which writers articulate personal sentiments and grand ambitions. Regarding tender sentiments, Meng Haoran’s 孟浩然 *At Year’s End, Composed on the Sea* 歲暮海上作 offers a poignant example:

“Since Confucius has passed, I too drift upon the sea. By dusk, I observe the Dipper turn, realizing the Year Star has shifted. Freely I wander among empty isles, fishing with no

expectation. I ask the man on the raft: where now lies the Cangzhou?"

Here, Meng Haoran likens himself to Confucius adrift, using the celestial movements to reflect the passage of time and his own detachment from worldly affairs. The poem concludes by evoking the legend of floating among the stars, thereby deepening the poet's acceptance of natural change.

In contrast, Cao Cao's 曹操 *Viewing the Vast Sea* 觀滄海 epitomizes heroic aspiration:

"East I ascend Jieshi, gazing upon the vast sea. Waters swell and sway; islands and mountains stand steep. Trees cluster densely; myriad grasses flourish. Autumn winds sigh; mighty waves surge. Sun and moon seem born within; stars appear amidst. Great is my joy; I sing to express my will."

In the twelfth year of Jian'an (207 A.D.), Cao Cao launched a northern expedition against the Wuhuan 烏桓. He set out in May and returned in September, passing from Liaoning 遼寧 through Jieshi 碣石 Mountain in Hebei 河北. There, he beheld the sea, islands, and the coastal grasses and trees. Stirred by the bleak autumn winds that whipped up surging waves, he felt a surge of heroic spirit within his chest. Inspired by the grandeur of the ocean that seems to swallow the sun and spit out the moon, he expressed his inner resolve through his writing. In the poem, the sun, moon, stars, and vast sea are skillfully woven into a single scene, creating an atmosphere of richness and immensity. He entrusted his magnificent ambition to the boundless sea, letting the scenery evoke his feelings, and embedding his aspirations within the landscape. The interplay between emotion and scene enhances the poem's expressive power, which is why it has long been praised by literary critics.

The Significance of Philosophical Reflection: Explaining the Way and Metaphors for Life

The sea's vastness and inclusiveness have also inspired philosophical interpretations. In Laozi 老子 (Chapter 66), the sea serves as an analogy for the Dao 道:

"The rivers and seas become kings of the hundred valleys because they lie below; thus they become kings of the hundred valleys."

Laozi compared the relationship between the Dao and the world to that between valleys and rivers or seas. He also said that rivers and seas are the kings of a hundred valleys. In other words, rivers and seas are where all streams converge, just as the Dao is what the world turns toward. The reason rivers and seas can gather countless streams is because they possess two great qualities: humility (being lower) and capacity (being able to contain). As the meeting place of all waters, the Dao likewise embodies these two essential traits.

Similarly, Mencius 孟子 (372–289 B.C.) employed maritime metaphors to discuss life and virtue. In *Mencius (Jin Xin I 盡心上)*, he writes:

"He who has observed the sea finds all other waters shallow; he who has visited sages finds speech difficult. To observe water rightly, one must watch its waves. The sun and moon shine; flowing water must fill its hollows to advance. A gentleman's pursuit of the Way likewise requires completeness to progress."

Mencius used the saying, "One who has gazed upon the sea finds it hard to be impressed by lesser waters," to illustrate the profound vastness of the Way of the sages. Zhao Qi 趙岐 (108–201) of the

Han dynasty annotated it, saying, “Those who behold great things have great minds; those who behold small things have small aspirations.” This draws on the method of observing water currents (*guan lan*) to explain the approach to studying the sages’ Way. Furthermore, by highlighting water’s nature of filling every hollow before moving forward, Mencius expressed the gentleman’s steadfast devotion to the Way—one does not rush into official service until one’s character and learning are fully formed.

The Significance of Narrative on Daily Life: Livelihood, Travel, and Scenery

Classical maritime literature also encompasses narratives reflecting real life. Regarding livelihood, Wang Jian’s 王建 *Ballad of the Sea Folk* 海人謠 highlights social realities:

“Sea folk dwell adrift without homes, diving for pearls and carving ivory to pay annual taxes.
Fierce waves block the way, yet palace storehouses remain ever full.”

The poem juxtaposes the hardship of sea dwellers with the court’s indifference, critiquing social injustice.

In terms of travel, Su Shi’s 蘇軾 *Crossing the Sea on the Night of June 20th* 六月二十日夜渡海 chronicles his return from exile:

“Stars cross, Dipper turns; at last the storm clears. Clouds disperse; the sea and sky reveal their innate clarity. Only the old man’s wish to float on a raft remains; faintly I hear the gibbons’ song. Though nearly perished in the southern wilds, this journey surpasses all past adventures.”

In this poem, Su Shi not only depicts the hardships and life-threatening dangers he endured while exiled to the remote and wild Hainan 海南, but also expresses the joy of finally returning north, as captured in the line “after bitter rain and fierce winds, clear skies return.” Moreover, during the crossing, as the clouds parted and the moon shone bright, he reached a profound realization of life’s true clarity and openness, as conveyed in the phrase “the sky and sea are naturally pure and clear.” The poem also alludes to Confucius’s saying about “floating upon the sea on a raft,” reflecting Su Shi’s own lament at being unable to realize his ideals and leaving behind only unfulfilled ambition. Written in a natural and fluid style, the poem skillfully employs classical allusions, conveys sincere emotion, and vividly portrays the scene. The seamless blending of feeling and landscape gives it artistic depth, making it a graceful and evocative work about crossing the sea.

Regarding scenic depiction, Meng Haoran’s *Watching the Tide with Yan at Qiantang* 與顏錢塘登梓亭望潮作 vividly captures the power of nature:

“For a hundred miles thunder roars; zither strings fall silent. Couriers rush to the riverbank, awaiting the tide. Autumn clouds stretch in sunlight; the Bohai appears as vast as the sky.
Surging waves like snow instill a chill among all who watch.”

This is a descriptive poem depicting the tidal bore of the Qiantang River 錢塘江. The poem vividly and accurately portrays the thunderous roar of the tide, its overwhelming and awe-inspiring grandeur, as well as the eager anticipation of onlookers craning their necks to witness the spectacle.

The Images of Clams in Song Dynasty Culture

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Abstract

The Song people had a more comprehensive observation and record of the physiological characteristics of “clams,” so the “clams” they created had more diverse appearances than those of previous dynasties, and they were both realistic and imaginative, and they made contributions and values in natural history, marine culture, marine literature, etc. The “clams” described by Song Dynasty literati have rich and diverse images such as being strong on the outside and soft on the inside, round and shiny and spiritual, silent, small in size and large in quantity, smelly and ugly, sweet and crisp, bloodless vegetables, precious and elegant, etc., reflecting the spiritual and cultural connotations of Confucianism, Buddhism, and Taoism in the Song Dynasty, which emphasized morality and integrity, protected marine resources, was compassionate and abstained from killing, and lived freely and long. From the side of “clams,” we can specifically see some characteristics of the spiritual world of Song Dynasty literati and the culture of the time.

Keywords: marine culture, marine literature, natural history, Song Dynasty culture, the images of clams

Introduction

The objects collected and observed in this article are clams, mainly texts related to “Bivalvia” mollusks with two equal shells, which are mainly divided into three types: Clamidae, Ostreidae, and Arcidae.

Literati began to describe the image of clams with an aesthetic eye during the Wei, Jin, Southern and Northern Dynasties. In addition to praising the beauty of their shells, they also appreciated their physiological characteristics and wisdom of lurking in the sand and not caring about worldly affairs. In the Tang Dynasty, new features were added to its ability to produce pearls and its characteristics of being “hard on the outside and soft on the inside;” and negative images began to be portrayed.

In the Song Dynasty, due to new demands for seafood, improved social productivity, urban economic development, and developed water and land transportation, “clams” gradually changed from tribute to the capital to a delicacy that can be seen in the market. The Song people's depiction of “clams” is therefore more diverse and complete than that of previous dynasties, combining realism and imagination, and containing profound cultural connotations, revealing the spiritual outlook of Song Dynasty literati, and is worthy of study in the aspects of natural history, marine culture, and marine literature.

Hard Outside and Soft Inside: The Contrast between the Inside and Outside of the Meat and the Shell Is Huge

Although clams have hard shells, they have soft flesh inside, which forms a huge contrast between the inside and the outside. Therefore, WANG Anshi(王安石) said: “The meat of clams is weak, but it relies on the shell to protect its body” (“Car Claw” 〈車螯〉詩), pointing out that the hard shell is the greatest support for the soft meat.

People in the Song Dynasty also applied this “hard outside and soft inside” trait to dream interpretation. For example, SHAO Yong’s “Menglin Xuanjie” (邵雍《夢林玄解》) believed that dreaming about “clams” was a “good” sign, because the contrasting characteristics can produce a harmonious effect of opposites complementing each other, symbolizing “harmony in all things.” The dreamer can find a good match or give birth to virtuous children.

Precious: The Pearl Inside the Shell Is Round, Lustrous, and Spiritual

The pearl in the shell is actually a product of a defense mechanism, but its round shape and white and lustrous color are loved by the public and regarded as a treasure. It is often used as a metaphor for precious people and things, such as SU Shi’s poem: “The ancients said that an old clam gave birth to a bright pearl!” (“Tiger”蘇軾〈虎兒〉詩), using the clam pearl to represent an excellent child.

At the same time, pearls from oysters also have spirituality. In the record of “The Return of Pearls from Hepu” in the Book of the Later Han (《後漢書》), it was said that the residents of Guangxi endowed pearls with the spirituality of despising greed and valuing integrity, and the pearls from Hepu could migrate or return on their own depending on whether the governor was honest or not. Although this record is full of imagination, it is very conscious of the protection of marine resources. This allusion was widely used in Song Dynasty poetry to congratulate officials on their birthdays or to congratulate new officials on their appointments, in the hope that they would be honest. For example, in LIU Kezhuang’s poem, “The politics in Hepu is clear and the clams are returning” “Sending Mingfu to the Copper and Lead Field” (劉克莊〈送明甫赴銅鉛場〉詩), which shows that the Confucian concept of honesty and morality was highly valued in the political culture of the Song Dynasty.

Sometimes, the things in the oysters are not necessarily pearls, but take the shape of the Big Dipper or the traces of a coiled dragon (蟠龍), such as the records in WANG Gong’s “Recent Records of Hearings and Sights” (王鞏《聞見近錄》) and LU You’s “Notes from Lao Xue’an” (陸游《老學庵筆記》). The God of the Big Dipper in Taoism controls the Big Dipper and can determine the time of death of a person; the dragon can help Taoists go to heaven and earth and communicate with ghosts and gods. These strange stories are full of Taoist connotations, reflecting the social atmosphere and cultural connotations of breaking away from reality and pursuing freedom and longevity.

In the Song Dynasty, there were more records of strange stories related to Buddhism, such as images of Bodhisattva, Guanyin, and Arhat found in clams. For example, HONG Mai’s

“Yijianzhi” (洪邁《夷堅志》) said: “Some people make images of Guanyin in a clam, with a dignified appearance, pearls, tassels, willow branches, and clean bottles.” The large number of documents about these “clam Buddhas” in the Song Dynasty should be related to the prevalence of Buddhism and the social atmosphere of releasing animals and abstaining from killing at that time, showing the cultural connotation of Buddhist compassion.

Sleepy, Quiet, Unwise: Silent in Action and Closes the Shells When in Danger

When the clams are alive, their adductor muscles are relaxed and their shells are slightly open, but because the opening is not large and their movements are silent, people regard them as quiet and sleepy creatures. Song people have made many descriptions of this. ZHU Lu’s “Record of Woyun Temple” (朱輅《臥雲庵記》) even describes the image of clams as “happy sleepy eyes,” believing that these sleepy people are unable to experience Zhuangzi’s carefree and contented state with their hearts, and use this to contrast his own pleasure of forgetting the world while lying under the clouds and wandering around.

Song people also felt that the way clams protect themselves by living in mud and sand and “closing their mouths” when in danger was extremely unwise. For example, WANG Anshi criticized them in “Car Claw” (王安石《車螯》詩) for “It is easy to be picked up by people, and the way to protect lives is unwise,” and advised them not to hide blindly and “suffer for a long time,” but to “be open-minded” and wander freely on the beaches of the world, accepting that life and death are determined by fate and they should live their lives as they please.

In addition, “Strategies of the Warring States” (《戰國策》) once derived the allusion of “the fight between the snipe and the clam” from the way clams closing their mouths to protect themselves. The Song people frequently used it to describe the scene of confrontation between two armies. There are more than 30 related poems and essays, and most of them are concentrated on the Southern Song Dynasty, which was threatened by foreign invasions.

Ordinary: Small, Clustered, and Abundant

Clams are tiny, often live in groups, and are numerous. As the saying goes, “scarcity makes things valuable,” small and numerous clams were often used by Song people as a synonym for ordinary, such as DU Daojian’s “Guan Yinzi’s Explanation of the Mysterious” (杜道堅《關尹子闡玄》): “Horned dragons represent saints, snake-tailed dragons represent sages, and turtles, snakes, fish, and clams represent ordinary people.” Clams and fish are used as a metaphor for ordinary people to contrast and set off the saints and sages like horned dragons and snake-tailed dragons.

In addition, Song people also liked to use “long fish” to contrast the smallness and ordinariness of clams, such as YUAN Shuoyou’s “To Mr. Zhongfu” (袁說友《寄于忠父先生》詩): “let the flowing water reflect the ice and snow, how can long fish be the same as shrimps and clams?” At the same time, Buddhism likes to compare “giant turtles” with shrimps and

clams to illustrate Buddhist principles, such as SHI Shiyi's "Eighteen Songs of Songs on Ancient Times, No. 15" (釋師一〈頌古十八首 其十五〉): "Catching shrimps and clams is easy, but when can I get six giant turtles?," revealing the Buddhist principle that only by not being greedy and not demanding can one's mind be peaceful and joyful.

Inelegance vs. Elegance:

Ugly Appearance, Fishy Smell vs. Delicious Taste, Measured Advancement, and Retreat

Although many Song literati viewed the "clams" produced in the southeastern coast as "others," considering them to be "unrefined" foreign objects with ugly appearance and fishy smell, such as MEI Yaochen's "Farewell to Su Zimei" (梅堯臣〈送蘇子美〉詩): "The shells are strange and trivial" and "the salty and fishy smell damages teeth"; however, there were still literati born in the coastal areas or serving as officials who praised "clams" and regarded them as officials and elegant literati. For example, MAO Sheng (毛勝), a scribe from Wuyue (吳越), wrote "The Book of Conferring an Official Title on Aquatic Creatures" (〈水族加恩簿〉), in which he used anthropomorphic techniques to confer official titles to the delicious "clams" such as scallops, claws, cockles, and clams. Another example, SU Shi of the Northern Song Dynasty wrote "Biography of Jiang Yaozhu" (蘇軾〈江瑤柱傳〉), in which he regarded Jiang Yaozhu" as a "refined man." He cleverly used its growth environment of growing in sea mud, its physical properties of being honest appearance, pure inner self, and the appropriate movement process to imply his selfish personality, his indifference to other people's right and wrong, and his measured advancement and retreat in the official career process.

Conclusion

The portrayal of "clams" in the literature of the Song Dynasty is very comprehensive, with rich and diverse images such as tough on the outside and soft on the inside, precious on the inside, sleepy and silent, unwise, ordinary, inelegant, and elegant. These images are not only frequently used in the daily dream interpretation, metaphors of people and things, political imagination, and life interests of the Song people, but also trigger the literati's emphasis on harmony, leisure and pleasure, forgetting the world and wandering, and being restrained in their actions from a literary perspective. They also specifically reflect the Confucianism of the Song Dynasty, which values morality, integrity, and the awareness of protecting marine resources, as well as the Buddhist spirit of compassion and abstinence from killing, and the Taoist spirit of freedom and longevity. Therefore, from the perspective of "clams," we can specifically see the spiritual world of the literati in the Song Dynasty and the cultural connotation of the times.

Impact of Trade Openness on Culture: Based on Threshold Effect Caused by Inequality of Income Distribution

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Abstract

What is the impact of trade openness on culture of a country? We pool panel data from 40 countries in five years (1984, 1989, 1994, 1999, and 2004) to study this issue empirically. The result shows that trade openness displays a promoting effect on culture of a country. But, this effect is significantly different in the countries where inequality of income distribution is extremely great. Besides, this conclusion is robust after solving endogeneity of trade openness variable by IV-GMM. Furthermore, threshold regression proposed by HANSEN (1999) is introduced to study the non-linear relationship between trade openness and culture caused by inequality of income distribution. It is found that a single threshold is significant in the model, with threshold level (Gini coefficient) of 0.414. The positive impact of trade openness would decline by 64% when inequality of income distribution exceeds the threshold level of 0.414.

Keywords: cultural progress, threshold effect, trade openness

Introduction

Trade openness reflected by commodity trade and foreign direct investment impacts the development of a country. The relationship between trade openness and economic growth is a hotspot which the current research focuses on in economics. There are many literatures on this issue, including openness and economic growth, openness and government scale, openness and research input as well as openness and efficiencies of enterprises under heterogeneity etc. However, the interaction between trade openness and other non-economic factors is rarely paid attention to. Just like the paper concerns, the impact of trade openness on cultural changes cannot be neglected. Trade openness means the interaction and interchange among different countries and different groups. Different values and codes of conduct are delivered and shared under the flow of economic factors. A country's culture will be influenced reversely while it affects other countries. So how does culture of a country change in its trade openness—enrich or erosion?

We define culture based on the widely accepted definition GUIISO (2006) proposed: culture is defined as customary beliefs and values that ethnic, religious and social groups transmit fairly unchanged from generation to generation. Specifically, culture can be divided

into four categories: trust, control and individual self-determination, respect, and obedience. The cultural traits of these four categories are closely associated with behaviors of economic activities of individuals and embodies of the entrepreneurship. They also reflect beliefs, attitudes and values in economic activities and can be regarded as “economic culture.”

Theories and Illustration

Impact of trade openness on culture: Two sides of one coin

BERNSTEIN (2008) notes what the trade brings about is not only material wealth, but also integration and development of different cultures in his study on development of Mesopotamia. Bilateral trade results not only in the exchange of physical goods and service, but also in exposure to different attitudes, beliefs, values and ideas. COYNE and WILLIAMSON (2012) note, “cultural exposure can be both direct and indirect.” Direct cultural exposure refers to bilateral trade in cultural goods and foreign direct investment by cultural enterprises, including media product, music, FDI etc., which influences local culture of trade partners directly. Indirect cultural exposure, in contrast, refers to unintended consequences of entrepreneurial activity, including management culture and consumption culture etc., rather than cultural dissemination. The indirect cultural exposure influences local culture and forms an ongoing diffusing effect. We should note that foreign culture brought by trade openness does enrich local culture and foster the integration of different cultures while some existing ones are disappearing. Just like two sides of one coin, the impacts of trade openness on culture include positive and negative externality.

“Cultural prosperity” refers to the positive externality of trade openness. The scholars who support it argue that trade openness leads to net positive externality and promotes the development of different cultures. COWEN (2002) notes that trade openness have more beneficial culture while destroying existing culture. Relative to those disappearing social beliefs, trade openness can raise individual consciousness and create more trading opportunities to cultivate mutual respect and trust. JONES (2006) notes that trade openness enhance integration of different cultures, reduces transaction costs among different groups and benefits to build mutual trust and rebuild social network. COYNE and WILLIAMSON (2012) note that trade openness has positive effect on culture.

“Cultural erosion” refers to the negative externality of trade openness. The supporters argue that trade openness can result in the erosion of social networks and hence social cohesion (RODRICK 1997, CHAN 2007). Openness would drown the existing values and codes of conducts, encourage individualism and the pursuit of own interests, and lower individual identity in the society (BARBER 1995, HUNTINGTON 1996). SCHIFF (1998), in his empirical research on races in Saharan Africa, notes that the reform of economy and trade intensifies the inequality of different races and escalates the tensions of different classes. The transformation causes negative effects on social stability and social integration. Therefore, though it brings

economic benefits, trade openness destroys standard of behavior and citizen's consciousness and leads to the erosion of a country's culture.

Impact caused by inequality of income distribution

Just like economic benefits from trade openness, interest groups can always grasp large portion of social wealth in this society where inequality of income distribution and serious social status disintegration exist. The interest groups always have "legitimate" reasons to build their own social network under the existing tradition and social values, though this network may be inefficient. Once foreign culture, beliefs and values pose threats to the existing culture, interest groups would use nationalism as an excuse to hinder the communication of beneficial culture with formal or informal methods (CHAN 2007). Meanwhile, the groups which share the same interests can come to an agreement more easily while the groups from different classes are lacking in trusts and respects (OLSON 1982). So, inequality of income distribution and class divisions do impede the communication of beneficial culture and affect the marginal effect of trade openness on culture.

The existing literatures prove that inequality of income distribution has a negative effect on cultural traits like trust, respect and values etc. ZAK and KNACK (2001) describe trust by time spent on transaction of low and high income groups, and find that lower equalization of income distribution results in more time spent on transaction in low income distribution group. CAMERER (2003) notes a more powerful research of experiments with economy principles that behaviors of objects derived from results of game theory. He takes non-self-interested into agent decision model including fairness and unfairness and finds that inequality of income distribution destroys the existing trust and respect.

To demonstrate the relationship between culture and trade openness, scatter diagrams (data see below) on them are provided. Fig. 1 depicts two regression lines, gray one with Gini-coefficient lower than 0.4 and the black one with Gini-coefficient larger than 0.4. In general, the correlation between trade openness and culture is positive, but for the line whose Gini-coefficient is lower than 4.0, the correlation is insignificant.

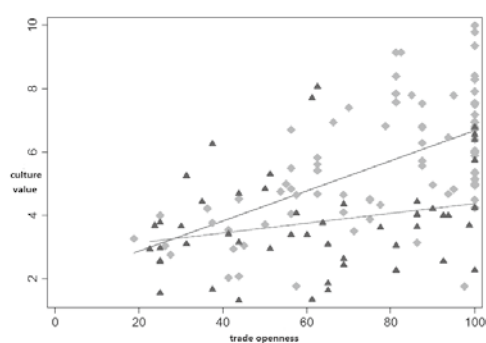


Fig. 1. The relationship between trade openness and culture.

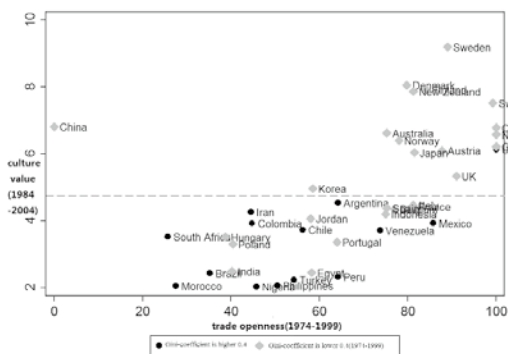


Fig. 2. The relationship between trade openness and culture (average value).

Table 1. Regression results of dependent variable.

	(1)	(2)	(3)	(4)	(5)	(6)
<i>open – cur</i>	0.041*** (0.005)		0.025*** (0.005)		0.056*** (0.015)	
<i>open – cap</i>		0.037*** (0.006)		0.026*** (0.005)		0.051*** (0.018)
<i>inequality</i>			-5.372*** (1.396)	-6.788*** (1.574)	-1.622 (2.444)	-0.969 (2.266)
<i>cur × ine</i>					-0.095** (0.042)	
Area Dummy	No	No	No	No	Yes	Yes
Time Dummy	No	No	No	No	Yes	Yes
<i>adj – R²</i>	0.28	0.22	0.53	0.46	0.67	0.65
<i>Obs</i>	132	136	123	127	123	127

Notice : ***, **, and * represent significance value at 1, 5, and 10 percent, respectively. Standard errors are in parentheses.

Table 2. Marginal effect of trade openness under inequality of income distribution.

	<i>inequality</i>			<i>inequality</i>			
	1/4point	mean	3/4point	1/4point	mean	3/4point	
<i>open – cur</i>	0.027	0.020	0.013	<i>open – cap</i>	0.027	0.022	0.016
Std.Error	0.006	0.006	0.008	Std.Error	0.006	0.007	0.010
	[0.000]	[0.001]	[0.091]		[0.000]	[0.003]	[0.105]

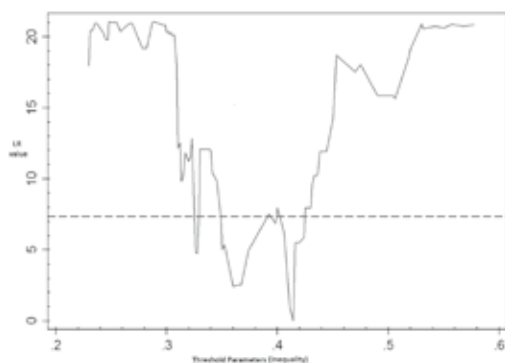


Fig. 3. A single threshold estimate and confidence interval.

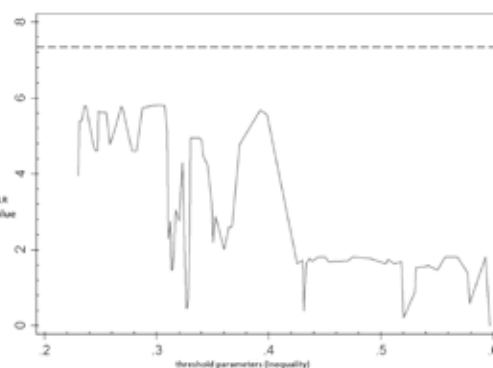


Fig. 4. A double threshold estimate and confidence interval.

Conclusion

Trade openness displays a significant positive impact on cultural progress. But what should be paid attention to is that the effect is not linear invariant. The correlation between trade openness and cultural progress is non-linear range with a single threshold caused by the different degree of inequality of income distribution. The promoting effect of trade openness on culture may be insignificant in some countries with extremely deteriorated inequality of income distribution.

The Emergence of a “New Dual Economy” in the Settlements of Global Economy-Dependent Island Nations: A Case Study of the Philippines and Fiji

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Abstract

This study introduces the concept of a “new dual economy” that arises in settlements of global economy-dependent island nations because of income source diversification strategies. Rather than residents of rural agricultural and fishing communities migrating permanently to cities in a one-sided manner, they maintain their relationship with their hometowns while engaging in livelihood activities directly or indirectly within their settlements. Then, using case studies from the Philippines and Fiji, this study elucidates the conditions and mechanisms that drive this phenomenon through the lens of development economics theory. It finally discusses the implication of this “new dual economy” on the economic development of island nations. Japan needs to learn from the experiences of the two countries that have successfully tamed globalization and achieved inclusive economic growth.

Keywords: Fiji, global economy, income diversification, new dual economy, Philippines

The progress of the cross-border flow of goods, money, and people, or globalization, is a driving force for economic growth in each country, but it also has both positive and negative aspects, causing economic instability and social inequality. In developed countries such as the United States, Europe, and Japan, social inequality and the number of people living in poverty are increasing. As PIKETTY (2014) highlights in “Capital in the Twenty-First Century,” the rate of increase in capital returns has outpaced economic growth rates, widening the income gap between asset holders and non-holders. Additionally, in Japan, population decline and aging in rural areas are exacerbating economic disparities.

The impact of globalization on developing countries varies. Even among countries that have benefited from globalization and achieved economic growth, some have seen economic disparities widen, while others have seen them narrow. In today’s increasingly globalized world, “taming globalization” has become a challenge for stable economic growth in both developed and developing countries (HELD and KOENIG-ARCHIBUGI 2003). Due to differences in government finances and institutional maturity between developed and developing countries, it is difficult to make a general comparison, but Japan can learn from countries that

minimize the negative aspects of globalization and maximize its positive aspects.

So, what kind of countries are those that “tame globalization”? Fiji and the Philippines, where the reporter conducts research, are considered to fit this description. Fiji has a population of approximately 940,000 (UNITED NATIONS 2024a), but in 2024, more than 1 million foreigners visited Fiji for tourism, exceeding the population (FIJI HOTEL AND TOURISM ASSOCIATION 2025). Tourism accounts for a high proportion of Fiji’s economy, representing 35–40% of GDP (IDE 2025). From 2016 to 2018, GDP growth rates were 2.5%, 5.4%, and 3.8%, respectively. After the spread of COVID-19 came to an end, GDP growth rates were 20% in 2022, 7.5% in 2023, and 3.7% in 2024 (IMF 2025a). On the other hand, the Gini coefficient, which measures income inequality, has declined significantly from over 38% in the early 2000s to 30% in 2019, indicating a narrowing of economic disparities. The Philippines is also a country that has achieved high economic growth while successfully narrowing economic disparities under the influence of globalization. The driving force behind the Philippines’ economic growth is the expansion of the Business Process Outsourcing (BPO) industry. Companies from around the world have recognized the high English proficiency of Filipinos and are investing in the Philippines. The scope of services has also evolved from call centers and data entry to IT support and accounting. The economic growth rate has achieved high growth of 5% to 7% since 2010, excluding the period of the COVID-19 pandemic (IMF 2025b). Economic inequality is also steadily decreasing. The Gini coefficient, which was 0.46 in 2003, improved significantly to 0.39 in 2023 (WORLD BANK 2025a).

It is noteworthy that these two countries are currently experiencing economic growth and income distribution equality based on globalization. Further data analysis and empirical research based on field surveys are needed to understand why this trend has been realized, but the author’s hypothesis is that the existence of local communities as a safety net plays a significant role in the residents of Fiji and the Philippines taking on unstable but high-income jobs. In Fiji, many rural areas continue to have a strong subsistence economy. In addition, the sense of community within villages is strong, so people do not need to worry about a shortage of food. They can simply grow their own food or ask for it. They can just grow or ask for food. It is possible to work in a large hotel while living in a village. In fact, when the coronavirus spread, most hotels in Fiji were closed, but employees did not face hardship because of the self-sufficient economy in their villages. In the village surveyed by the reporter, many villagers worked at nearby foreign-owned hotels, performing tasks such as cleaning and making beds (NISHIMURA et al. 2025). During the COVID-19 pandemic, the hotels closed, and those who lost their jobs subsisted by catching fish and shellfish at the beach and harvesting cassava from the hills. Such self-sufficient economies within the village are inclusive economies that allow participation from the elderly and sick, who are often overlooked by global capital. In the same village, one male resident disliked the menial labor at the hotel and instead engaged in nighttime diving fishing, selling large fish at the market.

The Emergence of a “New Dual Economy” in the Settlements of Global Economy-Dependent Island Nations:
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He stated that this provided better income, and a sense of fulfillment compared to working at the hotel. The same is true in the Philippines. The BPO contracts are by no means stable. Therefore, for workers, the existence of rural areas as a safety net is important. Those with roots in rice-farming villages do not face hardship in terms of staple foods. In fact, the proportion of the rural population in the Philippines has not shown a significant decline despite economic growth (WORLD BANK 2025b). In the rice-farming villages surveyed by the reporter for the first time in 20 years, various positive cycles emerged. First, there was an increase in overseas workers. Remittances have modernized villagers' housing and increased the number of private car owners. Second, there was a decrease in the number of landless agricultural workers, who were the poorest segment of the village population. The decrease in landless agricultural workers created a labor shortage, leading to increased mechanization in plowing and harvesting. As a result, agricultural workers' wages rose, with particularly high wages being paid to agricultural machinery operators. The third change was that overseas workers with experience were starting new styles of agriculture. They were undertaking new challenges that did not exist 20 years ago, such as organic farming and experiments in pumping irrigation water from underground using solar panels. The government's policy of returning urban populations to rural areas and aiming for harmonious growth between cities and rural areas (Balik Probinsya, Balik Pag-asa), which began in 2020 during the COVID-19 pandemic, is also considered to be a contributing factor (NATIONAL HOUSING AUTHORITY 2025).

What these two countries seem to have in common is the coexistence of an economy based on mutual assistance and employment directly linked to the modern sector in rural areas. This is a “new dual economy” that differs from the traditional dual economy of urban and modern economic sectors and rural traditional sectors. Despite the weakness of the national social security system, it is possible to “tame the global economy” by using the “new dual economy” as a foundation to reduce economic disparities while achieving economic growth in developing countries that rely on the unstable global economy. Japan, which has been unable to tame globalization, is now at a point where it must once again build a Japanese-style model. From 1955 to 1973, during Japan's period of rapid economic growth, the country embraced globalization by developing a unique economic system based on lifetime employment, a seniority system and company-specific labor unions. This system, like the Japanese family system called *'ie'*, turned Japan into an export powerhouse that threatened the American economy. At the same time, labor was supplied from rural areas to cities at the expense of the socio-economic structure of rural communities. The globalization of finance and supply chains has rendered this economic system dysfunctional. Japan now faces a critical juncture where it must consider how to build an inclusive economy, drawing lessons not only from advanced nations but also from developing countries.

Acknowledgements

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Shelling Out Insights: Understanding the Consumer Preferences and Buying Behavior for Oysters (*Crassostrea iredalei*) in Iloilo City, Philippines

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Abstract

Oysters significantly contribute to the aquaculture industry in the Philippines, particularly in coastal communities. This quantitative study explores consumer preferences and buying behavior to identify factors influencing oyster demand in Iloilo City. Using a structured survey distributed both online and offline, data were gathered from 116 respondents selected through multistage sampling. Descriptive statistics and multiple linear regression were employed to analyze the data. Results show that age and purchase location significantly affect oyster consumption. Older individuals tend to consume oysters more frequently, while proximity to the source increases purchase likelihood. These findings provide useful insights for oyster producers and marketers in Panay Island, highlighting the need to align marketing strategies with consumer demographics and accessibility to sustain and grow the aquaculture sector.

Keywords: consumer preferences, demand, oysters

Introduction

Oysters play an important role in the Philippines' aquaculture industry, especially in coastal communities. As one of the top aquaculture producers globally, the country values oysters for both food and economic benefits. However, production fell from 741.31 metric tons in 2018 to 298.01 in 2025 due to environmental challenges (PHILIPPINE STATISTICAL AUTHORITY 2025), underscoring the need to understand consumer preferences to support industry recovery.

Consumer demand is shaped by sociodemographic, product, and market-related factors. Insights into these areas help producers improve quality, ensure safety, and craft targeted marketing strategies (ANDALECIO et al. 2014, YUAN et al. 2023). Despite oysters being traditionally consumed in coastal areas, markets in urban centers like Iloilo City are underdeveloped, offering potential for growth.

This study explores the factors influencing oyster consumption in Iloilo City, providing data-driven insights to help stakeholders enhance market competitiveness and promote sustainable industry growth.

The model

Demand will be modelled as

$$Q_d = \alpha_0 + \beta_1 AGE + \beta_2 SEX + \beta_3 INCOME + \beta_4 HOUSEHOLDSIZE + \beta_5 EDU + \beta_6 PREP \\ + \beta_7 PRICE + \beta_8 ORIGIN + \beta_9 MEDICAL CONDITION \\ + \beta_{10} PURCHASELOC + \varepsilon_i$$

Where:

Sociodemographic factors:

Age (β_1). It refers to the length of time that a person or thing has lived and existed.

Sex (β_2). It refers to the person's biological sex, typically classified as male or female.

Income (β_3). It refers to the monetary asset that an individual or household receives through multiple sources, including work labor, investments, and more.

Household size (β_4). It refers to the quantity or number of people living in a household.

Educational Attainment (β_5). It refers to the highest level of education a person has completed.

Product-related factors:

Preparation Method (β_6). It refers to the way the oysters are prepared, such as raw, cooked, baked, etc.

Price (β_7). It refers to the cost of the oysters, which is influenced by factors such as production costs, market demand, and consumer willingness to pay for them.

Place of Origin (β_8). It refers to the geographic location where the oysters are sourced.

Price of Related Goods (β_9). It refers to the price of the products that are related to or consumed with oysters.

Accompaniment (β_{10}). It refers to the products or goods that are consumed along with oysters.

Market related factors:

Medical Condition (β_{11}). It refers to the specific and medically diagnosed health condition of an individual, whether they have physical or mental health issues.

Purchase Location (β_{12}). It refers to the location where consumers typically purchase oysters.

Companion (β_{13}). It refers to the people with whom consumers share their oyster-eating experiences.

Motives (β_{14}). It refers to the factors that determine the motivation of consumers for eating oysters.

Source Preference (β_{15}). It refers to where consumers prefer their oysters to be sourced from.

Methodology

The study was conducted in Iloilo City, Philippines, focusing on consumer demand and buying behavior for oysters sourced across Panay Island. Data were gathered using structured questionnaires administered within the city. A descriptive research design was employed. Using Slovin's formula (95% confidence level, 10% margin of error, and a population of 508,601), 97 respondents were selected through cluster random sampling from the districts of Molo, Jaro, and City Proper. Samples were proportionally distributed by district population. Descriptive statistics and multiple regression analysis were applied using Jamovi software to interpret the data and

Shelling Out Insights: Understanding the Consumer Preferences and Buying Behavior
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identify key factors influencing oyster consumption among Ilonggo consumers. The research was approved by the UP Visayas Research Ethics Board.

Results, Discussion, and Conclusion

Multiple regression analysis was used to determine the factors influencing consumer demand for oysters. Results showed an $R^2 = 0.75$, indicating that the regression model explains 75% of the variability in oyster consumption. Additionally, the p-value for the F-test results is $p < .001$, which implies that the exploratory power of the model is highly significant.

These findings provide valuable insights for crafting effective marketing strategies to boost oyster consumption in Iloilo City. With age identified as a key motivator, marketers can tailor campaigns to older demographics, highlighting health and nutritional benefits. Likewise, the importance of purchase location indicates that consumers prefer direct and local sources. Businesses can take advantage of this by strengthening their presence in seafood markets, offering promotions, and promoting farm-direct branding that emphasizes freshness and traceability.

From a managerial standpoint, the study's insights support more informed decision-making across the oyster value chain. Managers of restaurants, seafood markets, and oyster farms can realign their product offerings, pricing models, and promotional messages based on actual consumer behavior. Emphasizing preferred preparation styles, regional origins, and value-added features can boost appeal. Additionally, targeted campaigns for specific age groups can deepen customer engagement and drive demand. These strategies not only align with consumer preferences but also support sustainable growth in the local oyster industry.

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The Long-Term Economic Effects of Bridges: The 60th Anniversary of the Opening of Amakusa Five Bridges

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Abstract

In 1966, there were five bridges connecting Amakusa islands to the mainland. Various effects of the opening of the bridges have been researched with negative opinions. Population overflows from Amakusa islands are one of serious problems. However, from the perspective of economic geography, Amakusa islands have attracted to those of 10 local governments which are equidistant to Kumamoto city, prefectural capital. This fact lessened the negative opinions a little. This report analyzes the economic effects of the bridges from the perspective of per capita income. Per capita income in the Amakusa islands have continued to increase slightly, despite the widening income gap. It is certain that it provides a slight wealth to the residents of Amakusa islands. This result can be considered one of the economic effects of the bridge.

Keywords: Amakusa islands, per capita income, population outflows, wealth

Introduction

There are some negative opinions regarding the economic effects of the opening of Amakusa five bridges. NAKADATE and MAKINO (1990) researched comprehensively, and they came to a negative conclusion. Furthermore, MASUDA and JAPAN POLICY COUNCIL, SUBCOMMITTEE ON POPULATION (2014) was listed all municipalities as disappear-municipalities. It was estimated that municipalities in Amakusa islands¹ will disappear in 2050. These reports were typically one of negative opinions.

HAGINO (2024) analyzed economic effects about Amakusa five bridges by the Central Place theory of economic geography. The indicator was the rate of increase or decrease of the number of the population. It was considered Amakusa islands as a land-connected region and compared them with other municipalities based on their rate of population decrease (Table 1). As a result, it pointed

¹ Currently, the Amakusa Islands are made up of three municipalities, Kami-amakusa city, Amakusa city, and Reihoku town. Kami-amakusa city was formed in 2004 through the merger of the towns of Oyano, Matsushima, Himeto, and Ryugatake. Amakusa city was formed in 2006 through the merger of the cities and towns of Hondo, Ushibuka, Ariake, Goshoura, Kuratake, Sumoto, Shinwa, Itsuwa, Amakusa, and Kawaura.

out similarities with municipalities equidistant from the prefectural capital, Kumamoto city² (Fig. 1). It means that distance from the center has become an indicator of population movement in Kumamoto prefecture. Population increases and decreases are an indirect indicator of wealth, and it is not clear how wealth of residents in the Amakusa islands has changed as a result the opening. This report analyzes wealth on the Amakusa Islands, focusing on income.

Materials and Methods

I will use per capita income as an indicator of wealth. Pre-tax taxable income has been published by municipality since 1985 in Japan. Per capita income is calculated by dividing this income by the population³. These statistics were obtained from e-STAT (STATISTICS BUREAU, MINISTRY of INTERNAL AFFAIRS and COMMUNICATIONS).

Table 1. Municipalities with approximate population decline rates (2019/1995)⁴.

	1995/1965	2015/1995	2015/1965
Prefecture	103.9%	98.8%	102.6%
Amakusa islands	87.2%	79.4%	69.2%
Minamata	75.9%	78.0%	59.2%
Nagomi	77.4%	83.4%	64.6%
Oguni	68.6%	79.9%	54.8%
Takamori	67.0%	83.2%	55.8%
Ashikita	101.6%	77.2%	78.5%
Taraki	74.6%	78.5%	58.6%
Yunomae	73.8%	79.3%	58.6%
Mizukami	60.6%	77.2%	46.8%
Sagara	82.9%	83.0%	68.9%

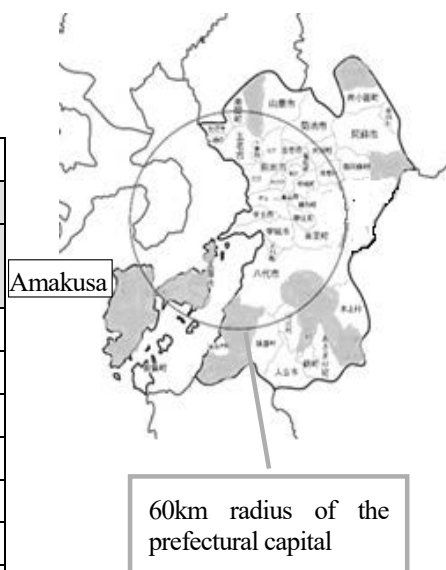


Fig. 1. Municipalities with a population decline rate similar to that of the Amakusa islands: filled with light-blue.

² Kumamoto city is the prefectural capital and its number of population is 42.5% of the population of prefecture in 2020, demonstrating its centrality in Kumamoto prefecture.

³ Taxable income includes pension in Japan. The income of elderly people receiving pensions is also included.

⁴ In the Amakusa Islands, the index is 79.4%. Municipalities with a population change rate (2019/1995) of 75% or more but less than 85% (Table 1).

Results

Per capita income in Amakusa islands is slightly lower than the per capita income in Kumamoto prefecture approaching to it year by year (Fig. 2). This is a unique trend among the local governments listed in Table 1. Furthermore, in Fig. 2, the standard deviation (stdev) of per capita income for each municipality in Kumamoto prefecture is increased (Table 2). This also means that the disparity in per capita income among local governments is widening. Nevertheless, the per capita income of Amakusa islands is getting closer to the per capita income of the prefecture. As a result, it can be said that the people of the Amakusa islands have certainly increased their real income and slightly increased their wealth.

Discussions

Economic effects of opening of the Amakusa five bridges are still unclear. We must solve the following problems to refine the research. First, there are two ways of thinking about the economic impact of the Amakusa five bridges. One is that there was a short-term economic effect, then, had disappeared within 60 years. The other is that there were long-term economic effects. The changes were so gradual that it's hard to find out. A more detailed analysis is needed.

Table 2. Per capita income (Unit: 1,000 yen).

Per capita income	1990	2000	2010	2020
Amakusa islands	611	875	789	987
Kumamoto city	1044	1295	1190	1419
prefecture	655	906	818	1027
prefecture stdev	138	151	147	150
Amakusa islands /Kumamoto city	58.5%	67.6%	66.4%	69.6%
Amakusa islands / prefecture	93.2%	96.6%	96.5%	96.1%

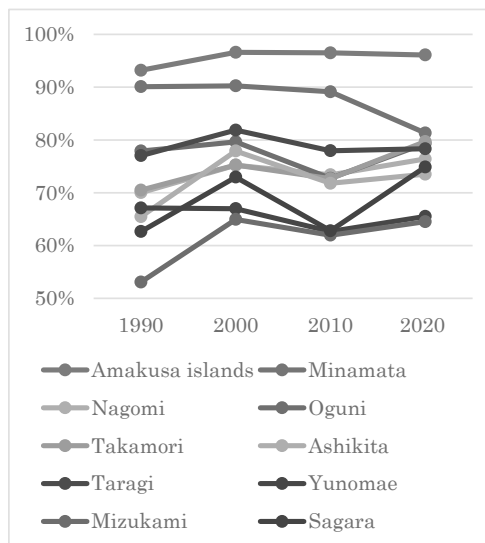


Fig. 2. Per capita income of local governments as shown in Table 1 relative to prefectures.

Secondly, the number of populations in the Amakusa islands was 107,460 in 2020. This population located a large shopping mall and discount store in Hondo, Amakusa city. Consumers enjoy low-priced goods and services with wide selections. The convenience of distribution routes to Hondo over the bridges must be analyzed as one of the economic effects of the Amakusa five bridges.

Conclusion

This report focuses on per capita personal income. Per capita income in the Amakusa islands has increased slightly and approached that, while the income gap is widening in Kumamoto prefecture, It is possible that the Amakusa five bridges have brought some kinds of effect.

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Space and Temporal Changes Following Bridge Connection in Shinan County, Republic of Korea

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Abstract

Bridges have a significant impact on the identity and survival of islands. An island to mainland bridge (IMB) may influence the island's sense of identity, but it can also enhance tourism and generate economic income, producing complex and diverse socio-economic and cultural effects. In Shinan County, Jeollanam-do, fixed bridges have been constructed since 2008, gradually connecting the islands to the mainland. This study examines the relationship between changes in land-use spatial patterns and socio-economic transformations before and after the construction of major fixed bridges in Shinan County. Jido Island, which was connected to the mainland in the 1970s, and Aphae Island, where the local government office is located, have shown consistent spatial pattern trends. In contrast, Jeungdo Island, which was connected relatively early in 2010, belongs to a group that has experienced limited social and economic development despite being physically connected. The effects of bridge connections vary by region, and in some cases, they appear to have long-term negative consequences.

Keywords: bridge, island to mainland bridge (IMB), land use, spatial pattern

Introduction

Islands in Korea have experienced socio-economic changes since the 1980s and 1990s, alongside shifts in the industrial system, population decline, aging, and various issues such as the construction of island to mainland bridges (IMB) and island to island bridges (IIB). In fact, many different datasets have warned about population decline and aging on the islands, and the impacts are clearly visible through the decrease in the number of students and the increasing closure of schools in island regions. This study aims to examine how the various changes that have occurred on the islands over several decades are actually reflected in reality, by analyzing changes in land use (KSENIJA and RODRIGUEZ-LEBAJOS 2018, TURNER et al. 2021).

According to KIM (2016), the landscape structure of Shinan County was examined based on land use types in 2012, and cluster analysis was conducted to classify the islands into three groups according to their landscape structures. The first group consisted of Jido and Aphaedo;

the second group included Imja, Jeungdo, Jaeun, Amtae, Anjwa, and Bigeum; and the third group comprised Docho, Palgeum, Jangsan, Shini, Hauli, and Heuksan. This classification was said to be influenced by land connections and transportation accessibility.

The present study aims to investigate how the land use types of Shinan County changed between 2007 and 2021 and to understand the implications of these changes. It also seeks to examine how the landscape structure has changed over time and to identify the patterns of such changes (MACGARIGAL and MARKS 1995, WAROUX et al. 2021). Shinan County, which has long maintained its identity as a group of islands (Fig. 1), has undergone processes of island to mainland connection and island to island connection, along with socio-economic changes. In general, “cultural topography” is a term used to describe the “shape of the land,” but it is also applied as a concept that spatially interprets various human phenomena, such as political and cultural landscapes (HONG 2022). Following HONG (2022), this study uses the term “cultural topography” to refer to a spatial territorial concept that represents the relationships among various phenomena. Therefore, this study examines how the territories of individual islands are interconnected and how they have been transformed through bridge connections.

Study Areas and Methods

Spatial pattern changes were analyzed using land use maps from 2007 and 2021, which represent the periods before and after the construction of major bridges. In addition, cluster analysis was conducted to identify similarities in spatial patterns.

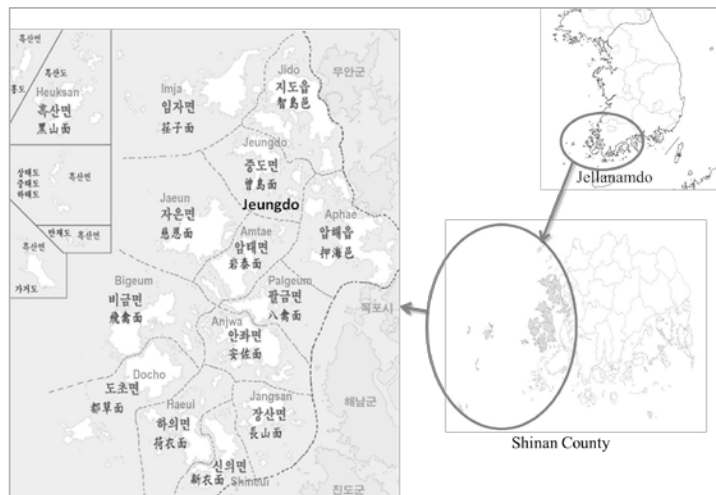


Fig. 1. Location of Shinan County, Republic of Korea.

Results

The analysis revealed that the largest land use changes occurred in forests, artificial grasslands, and agricultural lands. In most islands, the area of coniferous forests decreased, while the areas of broad-leaved forests and mixed forests tended to increase. In addition, the area of artificial grasslands increased. The decrease in coniferous forest area and the increase in broad-leaved and mixed forest areas appear to be the result of natural succession, with the rate of change seemingly accelerated by factors such as climate change. The increase in artificial grassland area is likely attributable to the development of various tourist facilities and parks on individual islands, which has led to an expansion of such land cover. In particular, Shinan County has seen substantial growth in artificial grasslands as part of the creation of park-themed tourist attractions that highlight the unique characteristics of each island. In the case of agricultural land, some areas have been converted into forests and other land cover types. This shift in land use appears to be associated with rural depopulation, as the abandonment of cultivated fields has become more prevalent.

At a similarity threshold of 75%, the landscape patterns identified through cluster analysis were classified into five groups. Group A in 2007 included Amtaedo, Bigeumdo, Jaeundo, Imjado, Dochodo, Hauido, Jeungdo, Heuksando, Shindo, Jangsando, Palgeumdo, and Anjwado. Group B comprised Aphaedo and Jido in 2007, as well as Heuksando, Jangsando, Shindo, and Palgeumdo in 2021. Group C in 2021 consisted of Amtaedo, Hauido, Imjado, Jaeundo, Bigeumdo, Dochodo, and Jeungdo. Group D in 2021 included only Anjwado, whereas Group E in 2021 consisted solely of Aphaedo and Jido.

Discussion

In most islands, the greatest land use changes were observed in forests, agricultural land, and grasslands. In particular, forest areas showed more conversions from coniferous forests to mixed or broad-leaved forests than vice versa, indicating an overall trend of transformation from coniferous forests to mixed or broad-leaved forest types. Consequently, the species composition within these forests is also likely to change according to the ecological characteristics of these new forest types (KIM 2013, 2014). However, it is unclear whether the broad-leaved forests identified in the land use data are evergreen or deciduous, and since the actual species composition of the vegetation has not been surveyed, it cannot be determined whether these changes are driven by climate change, natural succession, or other factors. While coniferous and mixed forests have been converted into other forest types or agricultural land, broad-leaved forests have shown fewer transitions to other land use types compared to the other two forest categories. This may indicate that broad-leaved forests, often located in

the interior, are less affected by surrounding land use changes.

In the temporal typology of Shinan County's islands, Aphaedo and Jido in 2007 exhibited spatial patterns similar to those of Jangsando, Shindo, Palgeumdo, and Heuksando in 2021. This pattern appears to result from the islands' proximity to Mokpo and Muan, where economic activities and daily life are facilitated by short distances and convenient transportation. Furthermore, Jaeundo, Amtaedo, Palgeumdo, and Anjwado—connected via fixed links in 2019—share a similar history of successive linkages over the years; however, their 2021 landscape patterns differ. Jaeundo and Amtaedo belong to the same group, whereas Palgeumdo and Anjwado are classified into distinct groups. A long-term examination of the landscape pattern changes in these four connected islands suggests that further analysis is needed to identify, in addition to the effects of fixed links, other factors shaping these cultural–geographical patterns.

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In Search of Balanced Governance in Island World

Heritage Sites: Amami and Jeju as Case Studies

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Abstract

This study compares the conservation and tourism management systems of World Natural Heritage Sites in South Korea and Japan, with a focus on Jeju Island and Amami Oshima. Building on prior research on night tour regulation in Amami and a literature-based review of Jeju's visitor quota system and certified guide system, the study examines (1) the implementation of visitor regulation policies, (2) the role of guides in environmental conservation, and (3) the prospects for community engagement in decision-making. As an ongoing project, it seeks to identify potential frameworks for balancing environmental protection and tourism by examining the roles and involvement of diverse stakeholders, including local residents, tour guides, and government bodies.

Keywords: stakeholder engagement, sustainable tourism, tourism management, World Natural Heritage

Recent discussions in heritage conservation have emphasized the evolving role of stakeholders in World Heritage governance. According to LEE et al. (2023), which reflects on the 50th anniversary of the UNESCO World Heritage Convention, there has been a significant shift toward recognizing the role of local communities and encouraging their participation in heritage management. In Japan, studies such as those by ITO et al. (2018) and KATO et al. (2019) have also discussed the importance of involving local residents in conservation efforts.

Against this backdrop, this study focuses on Jeju Island and Amami-Oshima, two islands in Korea and Japan, respectively, both designated as World Natural Heritage sites. Jeju was already a well-known tourism destination. However, its multiple heritage designations—including the 2007 World Natural Heritage status, as well as Biosphere Reserve, Global Geopark, and GIAHS—have brought renewed attention to the island's natural environment. At the same time, concerns about over-tourism and development pressures continue to grow. To address these challenges, regulatory tools such as a visitor quota system and a certified guide program have been introduced. However, academic research focusing on these systems, especially in the context of Jeju, does not yet appear to be sufficiently developed.

In Amami-Oshima, which was designated a World Natural Heritage site in 2021, a certified guide system has been introduced, and various institutional measures—such as mandatory guide accompaniment, vehicle access restrictions, and reservation systems—were implemented even before the designation in order to promote appropriate tourism use in designated areas. The author has previously examined the rule-setting process and associated challenges of night tours focused on observing the endangered Amami rabbit (SONG and SUZUKI 2022).

Building on previous research on tourism regulation in Amami-Oshima, this study shifts its analytical focus to Jeju Island, South Korea, to examine how related systems are designed and implemented. The main subject of analysis is the visitor quota system, an effort to optimize tourism use in the World Natural Heritage site “Jeju Volcanic Island and Lava Tubes.” The study aims to analyze the current state of ecotourism and regulatory frameworks on the island, while also referring to Japan’s conservation governance systems as a basis for considering improvements to Jeju’s institutional arrangements.

While systems such as the visitor quota policy and the “natural sabbatical year” have been introduced in Korea’s national parks with studies examining visitor perceptions and satisfaction (YOO et. al. 2009, LEE et. al. 2015, KIM and KIM 2021), research focused specifically on Jeju’s World Natural Heritage sites remains limited.

Jeju’s World Natural Heritage site is composed of three areas: Hallasan Natural Reserve, Seongsan Ilchulbong Tuff Cone, and Geomunoreum Lava Tube System. Among these, Hallasan and Geomunoreum are subject to the visitor quota system. In addition, Geomunoreum requires visitors to be accompanied by certified guides. This study focuses primarily on the visitor quota system and aims to clarify how these regulatory mechanisms are structured and managed.

In particular, the research will analyze the certified guide program required for Geomunoreum visits, examining the certification criteria, tour content, and how guide activities contribute to natural resource conservation. Future fieldwork will also explore how local communities perceive and interact with these regulatory systems, particularly about their involvement in planning and decision-making.

This preliminary study lays the groundwork for a deeper comparative analysis of community-based conservation in island World Heritage contexts.

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Seafood Cuisine and Island Tourism

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Abstract

Food and alcohol are cultural assets formed on the basis of biological resources from a specific region, functioning as important elements representing the region's biodiversity and cultural diversity. The Republic of Korea, a peninsular nation, possesses more than 3,400 islands, with Jeollanam-do often cited as a representative example of such an archipelagic region. Mokpo, an important port city where island and inland cultures meet, has created distinctive dishes by combining a variety of fish species with inland ingredients. In particular, sun-dried salt produced locally has become a key ingredient determining the flavor of food. As accessibility between islands and inland areas has improved, traditional island cuisine has evolved into new forms under the influence of urban food culture. These dishes are changing to suit tourists' tastes, developing into what is known as "bridge food," which incorporates diverse elements from the sea, islands, and inland areas. Mokpo has become a hub of this bridge food phenomenon, giving birth to iconic fusion dishes such as *hongeο samhap* (fermented skate with boiled pork and kimchi) and beef-octopus *tangtangi* (thinly sliced raw beef with octopus). Once considered local specialties, these dishes are now known nationwide. However, traditional island foods face threats such as aging populations, depopulation, and climate change. Ultimately, changes in island cuisine serve as important indicators of biocultural diversity, and how these foods connect to the sustainability of local communities will be a crucial task in the future. Preserving and developing traditional foods and cultures requires the effort and interest of all members of the community.

Keywords: biocultural diversity, bridge food, island food, Korean cuisine, port city, seafood

The world is currently facing multiple abnormal phenomena. Rapid climate change is disrupting the functioning of ecosystems worldwide. Species are moving in search of new habitats, and new organisms are appearing in altered environments. Likewise, people who have long settled in one place are moving to new spaces as ecological conditions change. The most essential factor for human survival is "food," which sustains life. Food is produced from natural organisms or through the modification of these resources, and this process generates a variety of cultures. Food lies at the center of various subcultures, including harvesting, storage, processing, cooking, seasoning, and eating methods. Especially when raising livestock or fish, the process becomes more complex. Thus, food can be considered the ultimate product of biocultural diversity, where biological diversity and cultural diversity intersect.

The concept of biocultural diversity lies at the intersection of the two paradigms of biodiversity and cultural diversity. In terms of food, human-created culture is closely linked to the diversity and complexity of natural and biological resources. Even within the same island, the types of fish or seaweeds vary depending on seawater temperature, and the lifestyle—namely, the culture—of harvesting and processing them also differs. Each island possesses a unique way of life depending on the types and uses of resources, and this applies to all islands. MAFFI Luisa of TerraLingua, an early proponent of the biocultural diversity concept, argued that just as various organisms in an ecosystem are connected through a food chain, human societies exist within a “web of life” linked to nature, in which countless living beings are directly and indirectly connected to human life. She explained that this web of life is expressed through three aspects—biodiversity, cultural diversity, and linguistic diversity—which operate as one within a socio-ecological adaptation system. At the intersection of these three diversities lie knowledge and practice. Food is the result of knowledge and practice that creatively use diverse natural ingredients. Originating from habitats of biological resources, food is passed down in language through expressions generated in cooking and eating, and diversifies according to the region. Especially in islands, where isolation is a key feature, food has long preserved unique compositions, eating styles, and flavors through traditional ecological knowledge.

Recently, however, with the development of transportation, external foods have been introduced to islands, and as they are adapted and spread, the uniqueness of island cuisine has been increasingly diluted. Nevertheless, traditional methods of cooking various local seafood enhance the value of biocultural diversity. Furthermore, even when using the same ingredients, cooking methods and flavors differ from island to island, making food an indicator of island identity.

Biocultural diversity maintained through traditional knowledge and practices is now under serious threat from climate change, environmental destruction, and globalization. As ecosystems change rapidly, the balance of nature is being disrupted, and with the introduction of external resources and technologies, the unique food culture and traditional knowledge that have existed for a long time in island regions are at risk of disappearing. Nevertheless, island residents are finding new ways to adapt, combining tradition and modernity to preserve biocultural diversity.

Korean island food goes beyond mere sustenance—it is a vivid expression of biocultural diversity where nature and human tradition intersect. The distinctive flavors and cooking methods of these foods offer a window into the deep relationship between people and their environment. In today’s rapidly changing world, preserving these food traditions is not simply about passing down the past; it is also a key to opening a sustainable future. As Korean society continues to develop, maintaining the identity and authenticity of island foods is

crucial. This requires efforts to protect traditional ecological knowledge and harmoniously adapt it within the flow of tourism and modernization. Only then can these foods remain as living cultural heritage and continue to evolve. Ultimately, island food is more than just a matter of what we eat—it symbolizes how we are connected to the world. In a single bite, there are not only ingredients, but also the history, environment, and lives of the people of that region. Valuing and promoting Korean island food culture is an act of preserving a heritage that nourishes both body and mind, and a profound practice that connects the past and future through food.

Korea is a peninsular nation with over 3,400 islands. Among them, Jeollanam-do contains many islands, and Mokpo is a representative port city connecting the sea and the islands. Due to its geographical features of clean seas, islands, and tidal flats, the area has long produced salt and used a variety of seafood as ingredients. As Mokpo developed into a major port city, people from across the country gathered there, and island traditional dishes fused with inland cuisine. Islanders accustomed to seafood began to crave meat dishes, leading to the creation of “bridge food” that connects the island and the mainland. A representative example is *tangtangi*, a dish mixing raw octopus with raw beef, and another fusion dish, *hongeο samhap*, which places fermented skate from the sea alongside pork from inland areas on one plate. Based on direct field observations and experiences in island food settings, I foresee two changes in island cuisine in the future. Considering various internal and external changes, the following points should be addressed for the future industrialization of island cuisine through food.

First is the degradation of the purity, uniqueness, and identity of island foods. This can be seen as a process of urbanization of food. While ingredients still come from the islands, the seasonings, sauces, and condiments that determine flavor are being altered to suit the tastes of tourists and urban dwellers, weakening authenticity.

Second is the change in ingredients. Various seaweeds, benthic organisms, and fish species that were not traditionally used as food are now being incorporated into dishes through new cooking methods, bringing positive changes. On the other hand, traditional fish species used in island cuisine are gradually decreasing. They have not completely disappeared, but seem to have migrated to other areas due to rising sea temperatures.

Ultimately, climate change is transforming the ecology, culture, and society of islands as a whole, which could shake the very foundation of island economies. The sustainable future of islands depends on how the biological resources—namely, the food ingredients—are preserved and utilized.

Reconstructing the Lost Church of Todos los Santos on Heping Island, Keelung, through Maritime Heritage and AI Visualization

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Abstract

This research digitally reconstructs the lost All Saints Church on Peace Island, Keelung, a significant Catholic edifice from the Spanish colonial era. Using comparative maritime heritage from the Philippines, Taiwan, and Japan, the study analyzes architectural typologies across port cities. Archival sources, archaeological remains, and AI-generated imagery are combined to recreate the spatial and cultural atmosphere of the vanished church. A 3D model—based on architectural inference—is used alongside AI visualization to simulate the site’s historical environment. The project further examines how these reconstructions can inform cultural product design and support local revitalization.

Keywords: AI visualization, maritime heritage

Research Motive and Purpose

During the 16th and 17th centuries, Spanish colonial expansion through the Asia-Pacific profoundly influenced the cultural and religious landscapes of port cities such as Manila, Keelung, and Nagasaki. The Todos los Santos Church on Heping Island in Keelung, though now lost, once represented a vital node of early Catholic presence in northern Taiwan. Recent archaeological findings have reignited scholarly interest in its historical importance. This study combines archival documentation, architectural typology analysis, and AI-powered visualization to reconstruct the church’s possible form and cultural setting. By placing the site within a transregional network of colonial churches, the research uncovers design features once lost to time. The project also examines how digital tools can be applied to restore erased sacred sites and re-engage local communities through culturally relevant design strategies.

Literature Review

Religious architecture and colonial power during Spain’s maritime expansion

In the 16th and 17th centuries, Spain expanded across the Asia-Pacific by harnessing maritime dominance and a vast network of religious institutions. Churches were not only centers of worship but also physical manifestations of colonial rule. Jesuit and Franciscan orders established churches and

schools in both coastal and inland regions, serving as ideological outposts. In the Philippines, churches built in the Earthquake Baroque style featured thick walls and large buttresses adapted to local seismic conditions, blending European construction techniques with indigenous design (REGALADO TROTA 1987). Decorative features revealed hybrid aesthetics that mediated between empire and local tradition (SUEIRO JUSTEL 2019). These churches also functioned as hubs for education, health, and social control (CAMBA 2012, YAMAGUCHI 2012). Compared to Latin American counterparts, Philippine churches were more regionally integrated (SKOWRONEK 1998). Though no longer standing, the Todos los Santos Church in Keelung exemplifies Spain's spatial strategies of religious and military dominance in early modern Asia.

Cross-regional Catholic architecture in early modern Asia

During the Age of Exploration, Spanish missionary activity in East Asia produced a variety of church architectures that adapted to local environments. In the Philippines, churches like Paoay, Miagao, and San Agustin embodied Earthquake Baroque features—thick walls and robust buttresses—designed to withstand frequent earthquakes, while incorporating indigenous artistic elements (VILLENNA 2024). Taiwan's Todos los Santos Church on Heping Island, though lost, shares structural similarities with churches in the Philippines' Cagayan Valley, indicating a transregional missionary design system (BORAO MATEO 2023). Likely constructed by Filipino or Chinese artisans, it reflects the flow of building knowledge across regions. Located above a harbor, the church also served military functions. In Japan, persecuted Christians built small wooden chapels with simplified exteriors yet preserved European-style altars, revealing strategies of cultural resilience (ARIMURA 2014). The Gothic-style Oura Church later became a symbol of religious resurgence during the Meiji era. These cases collectively show how sacred architecture was shaped by cross-cultural negotiations and colonial pressures in early modern East Asia.

Reconstructing the layered histories of Heping Island

Since the early 17th century, Heping Island has held strategic and symbolic significance. Situated near Keelung Harbor, it served as a maritime gateway and a contested site throughout various colonial regimes. In 1626, the Spanish founded Ciudad de San Salvador and built the Todos los Santos Church, making the island a key outpost for religious and military expansion (JOEL and SOPER 2014). Subsequent powers—the Dutch, Qing, and Japanese—imposed their own spatial ideologies, turning the island into a multilayered cultural and political landscape (CRUZ BERROCAL 2016). Archaeological excavations have revealed Spanish-era remnants such as stone foundations, ceramics, and coins (CRUZ BERROCAL et al. 2018). The footprint of the church aligns with the spatial codes in the Spanish Laws of the Indies, indicating planned colonial urbanism. With few structures remaining, digital reconstruction through 3D modeling and AI has become a critical strategy for reviving lost atmospheres. Interdisciplinary teams have used historical maps, documents, and site data to visualize the church's form and its context, transforming it into a platform for cultural renewal and engagement with maritime heritage.

Research methodology

This project employs a qualitative, practice-oriented methodology that integrates historical research,

Reconstructing the Lost Church of Todos los Santos on Heping Island, Keelung,
through Maritime Heritage and AI Visualization

architectural analysis, archaeological interpretation, and AI-based visualization to digitally reconstruct the lost Todos los Santos Church on Heping Island. The research unfolds in four stages: First, archival materials from the 17th century—including Spanish colonial documents, architectural plans, and historical maps—are examined to infer the church's form and spatial logic. Second, comparative architectural analysis of colonial churches across the Philippines, Taiwan, and Japan helps identify shared design elements and contextual distinctions. Third, speculative 3D modeling with Rhino, supplemented by AI tools such as ChatGPT, generates historically plausible reconstructions of the church and its surrounding environment. Fourth, the digital outputs are translated into tangible cultural products, such as educational materials, locally inspired merchandise, and community artifacts. The methodology establishes a design-driven model for cultural heritage revitalization through digital means.

Results

This study yielded three principal outcomes: (1) a conceptual 3D reconstruction of the Todos los Santos Church, (2) AI-generated visualizations recreating its historical context, and (3) prototypes for culturally themed design products. The 3D model—drawing from Spanish colonial churches in Manila and Nagasaki—represents a single-nave structure with a central bell tower, Romanesque portal, and masonry walls. It reflects archaeological findings on Heping Island, featuring buttresses, lateral windows, and simplified Baroque elements. Deliverables include floor plans, seafront perspectives, and sectional views, supporting applications in digital exhibitions and AR-based heritage tours.

AI-generated visuals developed through ChatGPT recreate the church's architectural ambiance using prompts focused on 17th-century maritime scenes, misty coastal environments, Catholic ceremonies, and Iberian stylistic cues. The interiors feature wooden trusses, candle-lit sanctuaries, and devotional imagery, constructing a multisensory experience. The imagery was assessed for historical credibility, emotional resonance, and stylistic integration, functioning as both interpretive media and vessels of collective memory.

To reinforce local identity, selected digital reconstructions were translated into design prototypes including T-shirts, bags, and keychains. These items seek to materialize historical memory into everyday artifacts for use in museums, tourism, and grassroots cultural initiatives.

Discussion and Conclusions

This study shows that the integration of historical analysis, architectural reconstruction, AI visualization, and design practices can effectively revive lost cultural heritage. In this case, the Todos los Santos Church on Keelung's Heping Island is not seen merely as a ruin but as a central cultural symbol in a trans-Pacific ecclesiastical network. Although the 3D model is hypothetical, it is grounded in archaeological evidence and enhanced by AI-generated atmospheric visuals, enhancing its realism and narrative depth. This "creative interpretation" functions both as an artistic expression and as a tool for fostering public memory. Merging generative AI with digital modeling provides a strong method for

rebuilding lost heritage, especially in historically complex port cities such as Keelung. However, these reconstructions remain provisional and demand ongoing critique, community engagement, and iterative testing. Ultimately, the study advocates for a move from traditional restoration to cultural revitalization, using digital tools as connectors between historical voids and current identity formation—providing a replicable model for Taiwan and other coastal areas.

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Geotourism Potential of Small Island in Semporna Sabah, Malaysia: Integrating Analysis of Volcanic Landscape and Local Cultural Heritage

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Abstract

This study aims to explore the geotourism potential of small islands in Semporna Sabah, Malaysia by integrating analysis from volcanic landscape and the uniqueness of local cultural heritage. The Semporna region, characterized by its Late Miocene to Quaternary volcanic formations and rich marine biodiversity, presents significant opportunities for sustainable geotourism. Coupled with the diverse cultural heritage of Bajau Laut and other indigenous communities, the area offers a unique blend of geological and cultural attractions of local wisdoms. This paper examines how geotourism can be leveraged to foster socio-economic development, promote geotourism awareness, and preserve the cultural heritage of small island communities. Through qualitative assessments from the fieldwork observation, this study highlights the role of the uniqueness of volcanic geomorphology, and the conservation strategies in enhancing geotourism in Sabah. The findings highlight the potential of integrated geotourism as a transformative tool for sustainable development and heritage preservation and community-based tourism potentials in small island settings.

Keywords: cultural heritage, geotourism, Semporna Peninsula, volcanic rock

Introduction

The Semporna Peninsula, located on the southeastern coast of Sabah, Malaysia, is a region renowned for its spectacular volcanic islands, rich marine biodiversity, and exciting indigenous cultures. Volcanic islands such as Sipadan, Bohey Dulang, Mabul, Sebangkat, Tetagan, and Bum Bum are remnants of ancient submarine and subaerial volcanic activities associated with the Sulu-Zamboanga arc system (JAMES et al. 2021, TJA et al. 1992). Sipadan Island, for instance, is a Quaternary volcanic cone rising abruptly from deep marine settings, reflecting rapid uplift and basaltic to andesitic lava extrusion (LIM et al. 1991). Volcanic formations such as those found on Bohey Dulang, and Sipadan Islands reflect the region's dynamic geological history, shaped by volcanic activity. At the same time, the socio-cultural fabric of the island communities, particularly the Bajau Laut (Sea Gypsies), presents deeply rooted traditions, oral histories, and maritime lifestyles that are intricately tied to the surrounding environment. Therefore, this paper aims to examine how the interplay between geological and cultural features can be strategically

harnessed to develop a cohesive geotourism framework that benefits small island communities, enhances visitor experience, safeguards the region's unique heritage till it potentially becomes community-based tourism center in eastern coast of Sabah, Malaysia.

Geomorphology and Landscape of Volcanic

The region is composed of various volcanic rocks such as basalt, andesite, and dacite, formed predominantly in a subduction-related arc setting (JAMES et al. 2021). This has resulted in unique geomorphological features, including lava domes, pyroclastic cones, volcanic plugs, caldera rims, and ignimbrite deposits. Prominent highland features in the mainland of Semporna Peninsula mainly can be observed at Maria, Magdalena, and Lucia volcanic peaks define the topography and landscape of the region (TJIA et al. 1992). There are also prominent volcanic peaks at the Bukit Tengkorak, near to the Semporna town. These landforms offer excellent examples of volcanic geomorphology, making them valuable for geoscientific research, conservation, and education. The integration of geomorphology with cultural and natural values underscores the geotourism potential of the Semporna Peninsula. Volcanic islands like Bohey Dulang, Mabul, Sebangkat, Tetagan, and Sipadan serve not only as remnants of submarine volcanic activity but also as iconic geosites with ecotourism and educational potential (LIM et al. 1991; TAHIR et al. 2010).

Globally, volcanic terrains such as those in the Canary Islands, Madeira, and Galapagos have demonstrated the value of geotourism in stimulating sustainable tourism development (CARRIÓN-MERO et al. 2024, SOTIRIOU and NUNES 2025). Similarly, the Semporna Peninsula presents an opportunity to establish a geopark to integrate geological, and cultural elements into a coherent geotourism strategy. As noted in the volcanic geosites in the Semporna Peninsula, the geological heritage embedded in lava flows, hot springs, and columnar joints also reflects indigenous narratives and local cultural identities, adding further significance to these natural landscapes (TAHIR et al. 2010).

The cultural dimension of the volcanic landscapes in Semporna—such as traditional folklore associated with volcanic hills and sacred landscapes—offers potential for culturally sensitive tourism experiences. In line with trends seen in La Palma and Galapagos, incorporating local knowledge and narratives into tourism packages can create a richer, more meaningful geotourism product that respects both nature and culture (DÓNIZ-PÁEZ et al. 2024, HERRERA-FRANCO et al. 2022).

Socio-Culture and Volcanic Geomorphology

These islands exhibit geomorphological diversity—ranging from pyroclastic cones and calderas to submarine volcanic plugs—which are representative of subduction-related arc volcanism (JAMES et al. 2021). The geomorphological complexity of these islands enhances their scientific value and affirms their potential as geotourism sites that warrant formal recognition and

protection (KOMOO et al. 2004). Geotourism in this context refers to geological features of intrinsic scientific, cultural, or aesthetic value. The volcanic landforms embody processes such as lava flow emplacement, hydrothermal alteration, and marine submergence that contribute to both geomorphological diversity and geodiversity (SOTIRIOU and NUNES 2025).

The socio-cultural of these island communities, particularly in Mabul is closely tied to their marine and volcanic landscapes. Many of the residents, including the Bajau Laut and Suluk ethnic groups, have historically adapted to these environments through fishing, seaweed cultivation, and artisanal crafts (MOHAMAD et al. 2023). The advent of geotourism and marine-based ecotourism has transformed these socio-economic structures, offered alternative livelihoods while promoted cultural identity (ROSMIZA et al. 2025). Social identity, especially in communities like Mabul Island, is strongly influenced by tourism development, which reshapes communal roles, intergroup relations, and resilience (NORHAYA and AMRAN 2015). Mabul Island also hosts indigenous groups whose traditions and economic practices, like artisanal fishing and eco-tourism, are grounded in the natural volcanic setting (YUSOH et al. 2023). Likewise in Bum Bum Island, Semporna which potentially offers community-based tourism in the development of homestay programs. The community-based homestay program is a newly taken economic activity in the Bum Bum island an alternative to seaweed cultivation which is not permanent and 'seasonal based' (HUSSIN et al. 2015, KUNJURMAAN V., 2022).

Furthermore, the integration of geotourism with local cultural values enhances the sustainability and inclusiveness of tourism development. According to TEH et al. (2011), small-scale fisheries, though economically undervalued, are foundational to community sustenance and cultural resilience. By aligning geoheritage conservation with traditional knowledge systems and participatory planning, the small islands in Semporna Peninsula can exemplify a model for community-driven sustainable development in volcanic island environments.

Conclusion

The Semporna Peninsula's volcanic landscape is not merely a relic of geological processes but a dynamic space for interdisciplinary geotourism development. Its geodiversity and cultural narratives position it as a strong candidate for geotourism recognition and sustainable tourism ventures. Future efforts should focus on systematic geosite inventories, infrastructure development, and community engagement to realize its full potential as a geotourism destination. The success of geotourism in this region will depend on multi-stakeholder collaboration that values scientific significance, cultural traditions, and environmental sustainability.

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Ecological Resilience and Community-Based Conservation in Island Wetlands: A Case Study of Cingluo Wetland, Penghu, Taiwan

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Abstract

Cingluo Wetland, located in Penghu Archipelago of Taiwan, is a nationally significant wetland featuring diverse habitats such as intertidal zones, mangroves, and sandy spits, and supports vibrant biodiversity. Over the past five years, dynamic ecological monitoring has recorded 318 species of vascular plants, 22 butterfly species, 13 dragonfly species, and 231 species of mollusks. The little tern (*Sternula albifrons*), a key indicator species, has shown increased nesting and hatching success due to habitat restoration efforts, though it remains threatened by predation from stray dogs. The tri-spine horseshoe crab (*Tachypleus tridentatus*), considered a living fossil, maintains one of Taiwan's most stable populations within this wetland, underscoring its high conservation value. This study synthesizes recent ecological surveys and habitat assessments to evaluate ecological resilience and conservation challenges. Findings indicate that habitat enhancement significantly improves reproductive success for key species, while unmanaged external pressures continue to pose ecological risks. The study recommends strengthening long-term monitoring systems and promoting multi-stakeholder cooperation, especially local community involvement, to foster sustainable island wetland governance. Furthermore, the wetland's potential as a site for environmental education and eco-tourism should be carefully developed in line with its ecological carrying capacity.

Keywords: biodiversity, community-based conservation, ecological monitoring, island wetlands

Introduction

Due to their isolated geographical locations and unique ecological conditions, island wetlands play a critical role in global biodiversity conservation and climate regulation. As climate change intensifies worldwide, wetlands are increasingly recognized as vital natural resources for mitigating environmental impacts. They offer essential ecosystem services such as water retention, climate regulation, flood absorption and storage, and disaster risk reduction. Moreover, wetlands help filter pollutants by trapping, decomposing, and transforming chemical and organic waste, making them indispensable ecological buffers against extreme weather and anthropogenic disturbances (HO et al. 2012).

However, with the accelerating wetland degradation and loss trend, wetland governance models have also begun to shift. In the past, conservation efforts primarily emphasized “ecological isolation,” led by central governments, focusing on zoning and restrictions. While this approach aimed at protection, it often failed to address local livelihood needs and the dynamic nature of environmental changes. BELL-JAMES (2020) argues that wetland governance should evolve beyond the “stacking of policy tools” into systems capable of cross-sectoral integration and locally responsive governance. Institutional gaps, she notes, are key obstacles to effective management.

As a nationally important wetland, the Cingluo Wetland in the Penghu Islands of Taiwan encompasses diverse habitat types, including intertidal zones, mangroves, and sandspits, and supports rich biodiversity. It is a valuable empirical site for studying ecological resilience and community-based conservation models. This paper takes the Cingluo Wetland as a case study to examine recent findings from flora and fauna monitoring, assess the effectiveness of habitat management, and further analyze the evolving governance model and its potential for sustainability.

Methodology

This study adopts a mixed-methods research design, integrating quantitative ecological monitoring data with qualitative social investigation to comprehensively evaluate the environmental resilience and community-based conservation effectiveness of the Cingluo Wetland in Penghu, Taiwan. First, we compiled monitoring data collected between 2019 and 2024 by the Penghu County Government and academic institutions. The dataset includes occurrence records and population trends of six major biological indicators: vascular plants, butterflies, dragonflies, mollusks, little terns (*Sternula albifrons*), and tri-spine horseshoe crabs (*Tachypleus tridentatus*). These ecological data were cross-analyzed with records of habitat restoration and anthropogenic disturbance events over the years to assess correlations between species dynamics and habitat conditions.

Second, participatory observation was conducted to gain an in-depth understanding of community involvement in wetland governance. The researcher engaged long-term in local patrols, conservation activities, and community meetings, allowing for firsthand insights into local participation’s operational mechanisms and constraints. In parallel, semi-structured expert interviews were carried out with wetland researchers, local conservation advocates, and relevant government officials to gather diverse perspectives on habitat management, wildlife protection, and community roles.

Additionally, three community workshops were held between 2023 and 2024, focusing on themes such as “awareness of indicator species conservation,” “defining community roles,” and “visions for co-management.” These workshops collected local knowledge, perceptions, and suggestions regarding wetland governance.

The compiled quantitative and qualitative data were cross-validated using triangulation

to enhance the reliability and validity of the research findings. Based on these insights, the study proposes strategic recommendations for the sustainable governance of island-type wetlands.

Research Findings and Analysis

Current status of biodiversity

A total of 318 species of vascular plants were recorded during the study period, including numerous halophytes and intertidal specialists, indicating the presence of diverse microhabitats in the Cingluo Wetland. Twenty-two species of butterflies and thirteen species of dragonflies were found along wetland edges and vegetation zones, reflecting high habitat heterogeneity at the land–water interface. Additionally, 231 species of mollusks were documented, with their abundance and diversity suggesting stable intertidal productivity and a robust benthic community structure.

Performance of indicator species and habitat management effectiveness

As key indicators of wetland ecological health, the little terns showed significantly improved breeding performance following habitat restoration efforts. Nesting site numbers and hatching success rates increased in sandspit areas, indicating reduced human disturbance and improved habitat quality. The population of the tri-spine horseshoe crab remained stable, with juvenile occurrences consistent with the five-year average, suggesting the continuity and resilience of their breeding and nursery environments with minimal external disturbance.

Anthropogenic disturbance and conservation challenges

Field observations and community feedback indicate that the central human disturbances currently affecting the wetland include stray dog intrusion, accumulation of waste, and unregulated recreational activities—all of which threaten habitat stability. The absence of long-term institutionalized management and cross-sector collaboration remains a significant bottleneck in improving governance effectiveness.

Community participation and governance mechanism

This study found that by involving local community associations, schools, and volunteer groups in wetland tours and ecological monitoring, the Cingluo Wetland has gradually built a grassroots conservation network. This has contributed to enhancing public awareness of the environmental value of the wetland and increased willingness to participate in its protection.

Discussion and Recommendations

This study demonstrates that the Cingluo Wetland possesses high biodiversity and stable

populations of key indicator species, reflecting the positive outcomes of habitat restoration and ecological monitoring efforts in recent years, particularly for emblematic species such as the little tern and the tri-spine horseshoe crab. However, ongoing threats such as recreational disturbances and waste accumulation highlight the need to strengthen ecological disturbance control mechanisms.

Regarding community participation, residents have gradually developed a stronger sense of identification with wetland resources. Nonetheless, current participation mechanisms remain informal and lack institutionalization. The allocation of responsibilities and resources is still unclear, making governance momentum vulnerable to individual leadership fluctuations and challenging to sustain over the long term. Based on the findings, this study proposes the following recommendations:

- 1) Establish a routine management framework: Strengthen habitat maintenance and stray animal control through science-based monitoring and decision-making to protect critical nesting and breeding areas.
- 2) Promote community co-management: Empower local associations and schools by institutionalizing participatory structures and incentive mechanisms to shift residents from passive collaborators to active stewards.
- 3) Foster cross-sector integration and legal support: Encourage collaboration between central and local governments to incorporate Cingluo Wetland into legally supported management plans that engage agricultural, educational, and tourism sectors in formulating sustainable strategies.
- 4) Enhance environmental education and public engagement: Improve interpretation systems, update on-site educational materials, and leverage digital platforms to deepen public understanding of wetland functions and conservation values, cultivating future environmental citizenship.

As a representative island wetland in Taiwan, Cingluo exemplifies ecological resilience and the potential for community-based environmental governance. A sustainable future for island wetlands hinges on continued cross-sector collaboration and meaningful community participation that integrates environmental, cultural, and social dimensions.

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Community Based Fishery Resource Management and Sustainable Small Island Conservation in Maluku Islands

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Abstract

The Maluku Islands consist of at least 1,388 islands and contribute 30% of Indonesia's national fisheries production and marine conservation areas. However, most local fishermen have low productivity and income. We will discuss sustainable marine resource management and conservation development in small islands in Maluku. The Maluku community has local wisdom that has the potential to strengthen food security. Technology and community-based resource management practices implemented in Maluku can conserve fishery resources in the long term, such as through the practice of Sasi (a prohibition for residents to take marine or agricultural products at certain times). The community also has local knowledge of fishing areas and traditional navigation.

Keywords: conservation, fishery resources, local wisdom

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Sustainable Resource Use in a Fijian Village over the Last 10 Years

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Abstract

A case study of sustainable resource use in the Fiji coastal zone will be presented based on examples from coastal villages. This study was conducted in August 2024 in a settlement southwest of Viti Levu Island, using economic data from the settlement, terrestrial and coastal environmental data, and a survey of coastal resource abundance.

Keywords: Fiji, fisheries

Introduction

Ecosystems across the Earth are composed of diverse assemblages of plants, animals, and inorganic substances that serve as important resources for human use. Our lives in recent years have drastically changed because of environmental alterations and economic globalization. Thus, it is crucial to consider new directions for the sustainable use of resources. Determining the transition process of how various factors influence and change the environment and clarifying the interrelationships among them can lead the way for future policy decisions.

This study investigated the socio-economic status and the state of the natural environment surrounding N village, a coastal village in Fiji, South Pacific, in August 2024. The study examined the latest sustainable resource use on islands to address: 1) the relationship between household composition and economic status in all households in the village; 2) the relationship between habitat environment, ecology (density and size) of the bivalves *Anadara* spp. (commonly known as *Kaikoso* and an important fishery resource), and catch frequency of *Kaikoso* in each fishing ground; and 3) the water quality within the village and in the sea. Our aim is to elucidate the changes since 2013 and discuss the direction of

sustainable resource use in the village by clarifying the transition process over the last the last 10 years.

Sustainable Development in This Area

To maintain a sustainable socio-economic system that increases current cash income while being resilient to sudden risks, it is important not only to increase employment outside the village but also to maintain the resources from the marine and terrestrial areas of the village as a source of nutrition and cash income. Therefore, the natural environment must be maintained in good health.

Mangrove forests extend along the village foreshores. Mangrove forests maintain a healthy water environment and provide food for organisms, wind and wave protection, and food sources. On the ocean side, tidal flats are formed, providing habitat for many organisms such as shellfish and sea cucumbers. Like mangroves, tidal flats also provide food and improve water quality. Coral reefs are present in shallow waters where seawater is purified, thereby maintaining an environment that can be inhabited by many organisms.

Domestic wastewater from the village mostly percolates underground during the dry season but flows out as surface water during the rainy season. As both the east and west catchments in the village are connected to the mangrove forest on the foreshore, domestic wastewater is one of the factors affecting the natural environment of the foreshore. It is highly likely that domestic wastewater from the village is purified by the mangrove forest and tidal flats, and it can be inferred that this forest serves a very important function for the village.

For these reasons, the mangrove forest and tidal flats in front of the village are not only important for the food supply of the village but also contribute greatly to the functionality of concealed environmental conservation and the establishment of flexible livelihood systems. Therefore, the management and conservation of these ecosystems are imperative for the development of villages based on sustainable resource use.

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