

Critical Indicators on Marine Spatial Planning and Community Renaissance around Turtle Island, Chinese Taipei

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PECC International Project 2011-2012: Sustainable Management of Marine Resources
November 22, 2011

photo by Jimmy Lee

Outline

- **Introduction**
- **Turtle Island**
- **Research Method**
- **Empirical Analysis**
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 - **Cross analysis of importance and satisfaction**
 - **Factor analysis**
- **Conclusion**

Introduction

- In 2006, White Paper of Marine Policy planned to designate Turtle Island as a **Marine Protected Area** (MPA). It's unable to achieve due to Turtle Island being near an important economic fishing ground.
- This study focus on **Marine Spatial Planning** (MSP) and critical indicators on **Community Renaissance**.

Marine Spatial Planning

(UNESCO, 2010)

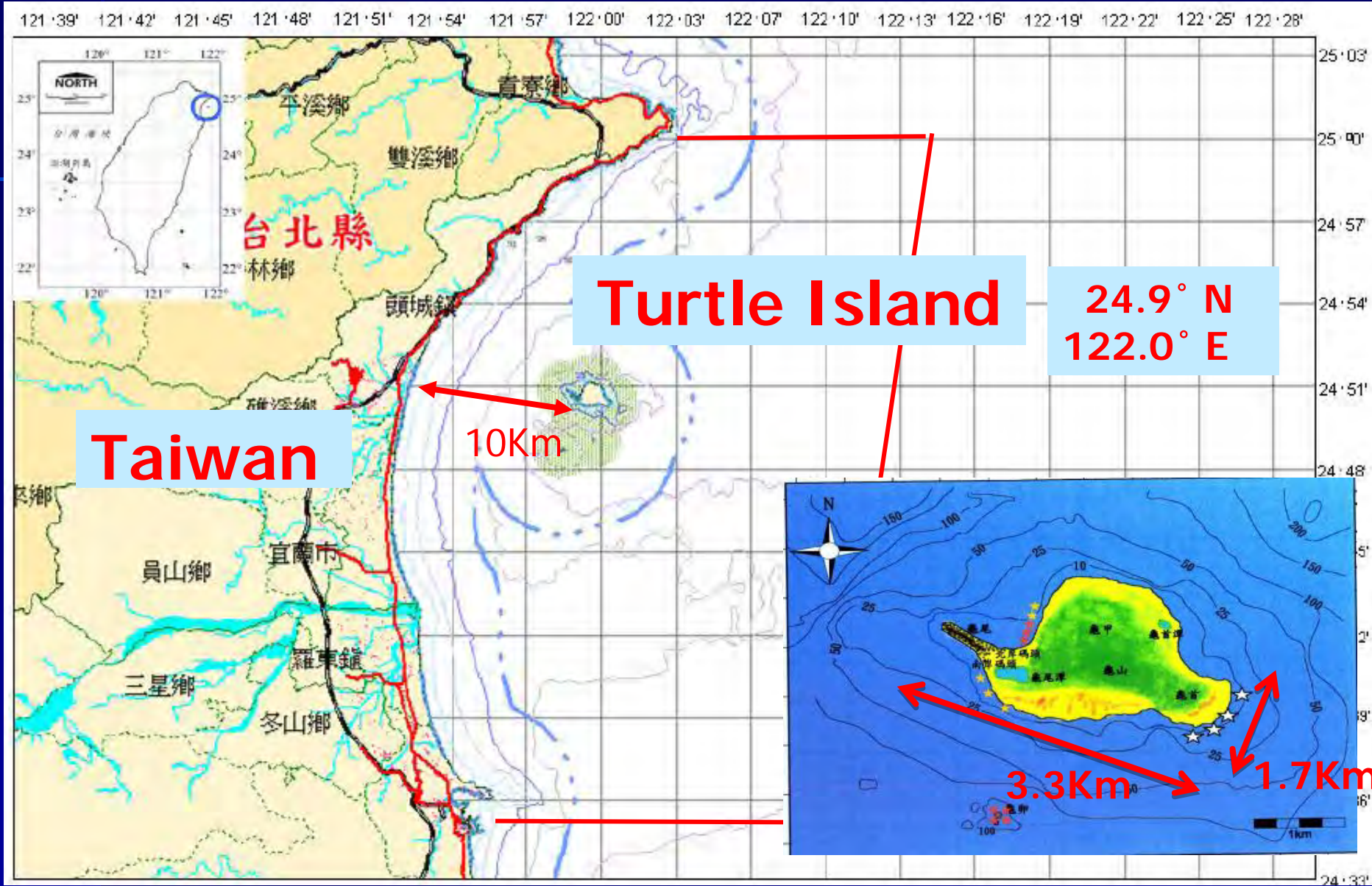
- MSP is a public process of analyzing and allocating the spatial and temporal distribution of human activities in marine areas to achieve **ecological, economic, and social objectives** that usually have been specified through a **political process**.
- Characteristics of marine spatial planning include ecosystem-based, area-based, integrated, adaptive, strategic and participatory.

Turtle Island

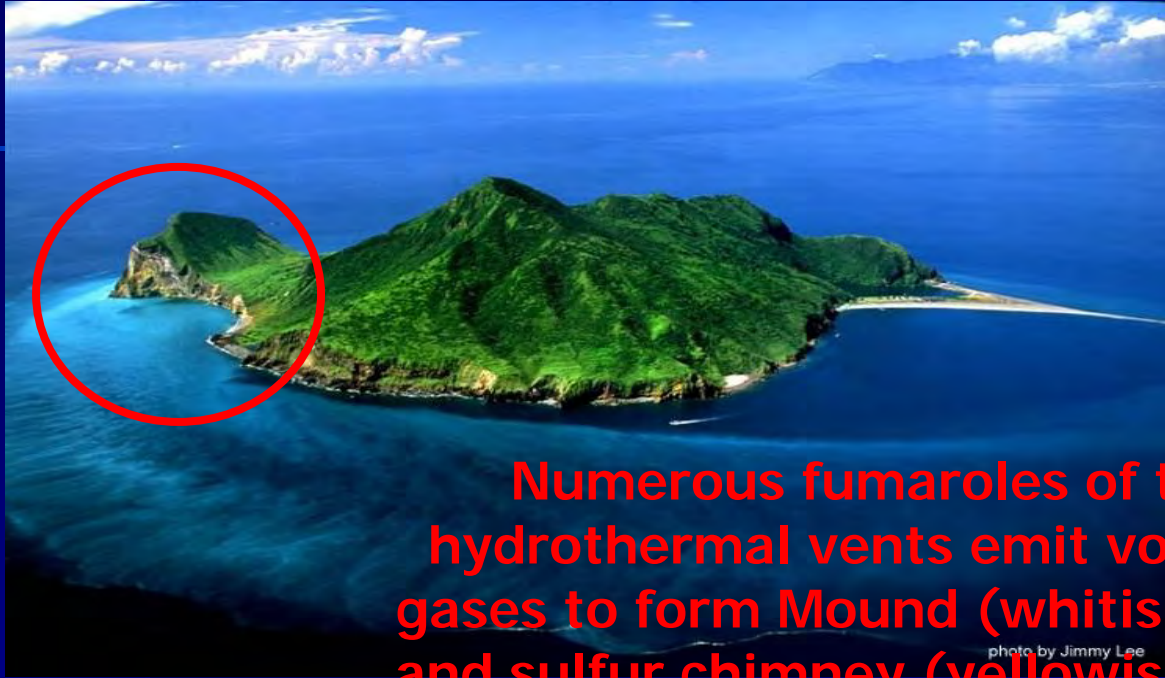
IMAPS World Atlas of Biodiversity



龜山島位於頭城鎮東方外海約10公里處，全島面積約2.7平方公里，島軸東西長約3.3公里，南北寬約1.7公里，島的四周海岸線長約10公里



Natural Resource Surrounding Turtle Island



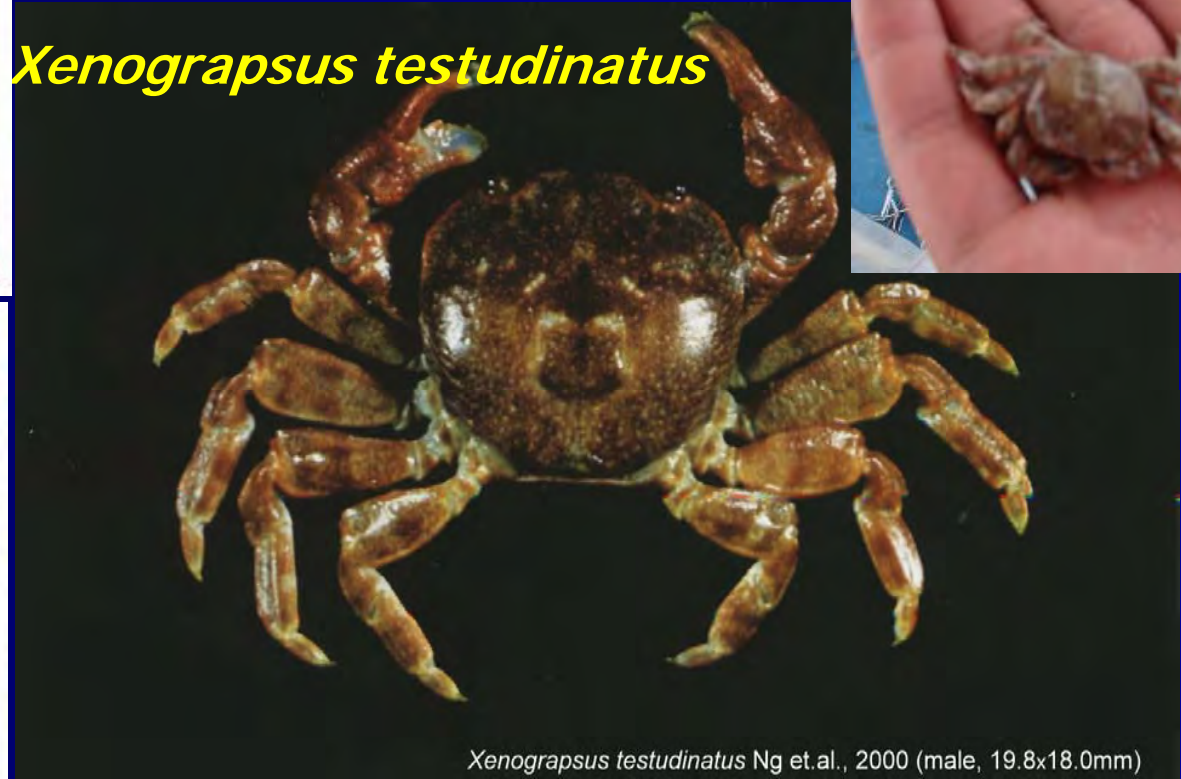
Numerous fumaroles of the hydrothermal vents emit volcanic gases to form Mound (whitish fluid) and sulfur chimney (yellowish fluid)

The tallest chimney reaches 6 m, which is rare for shallow vents.



New species of hydrothermal crab, *Xenograpsus testudinatus*
(Crustacea : Decapoda : Brachyura : Grapsidae) Turtle Island

Ng, N. K., Huang, Jung-Fu and Ho, Ping-Ho



87 kinds corals

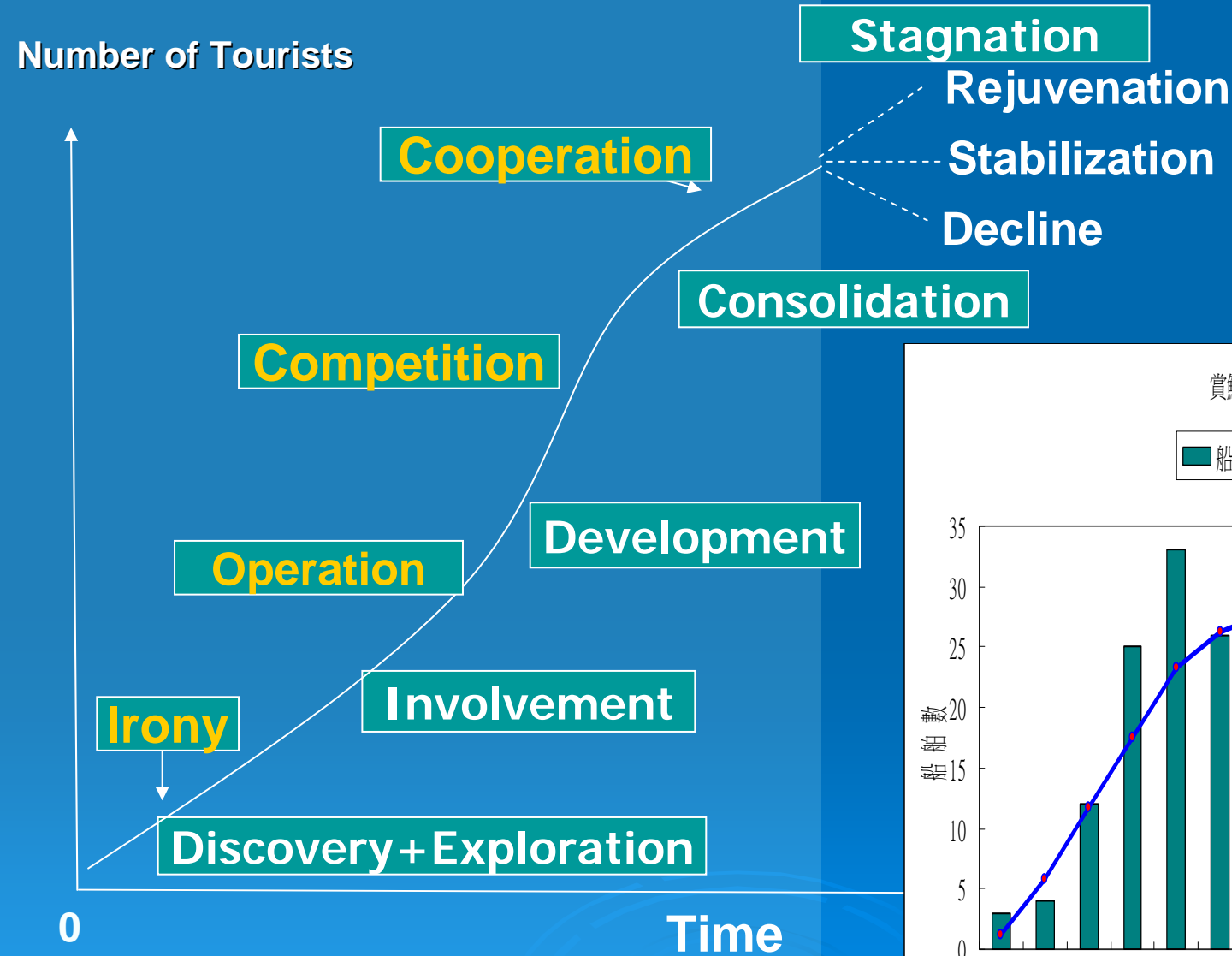
fish of coral reef area has 45 family 298 kinds



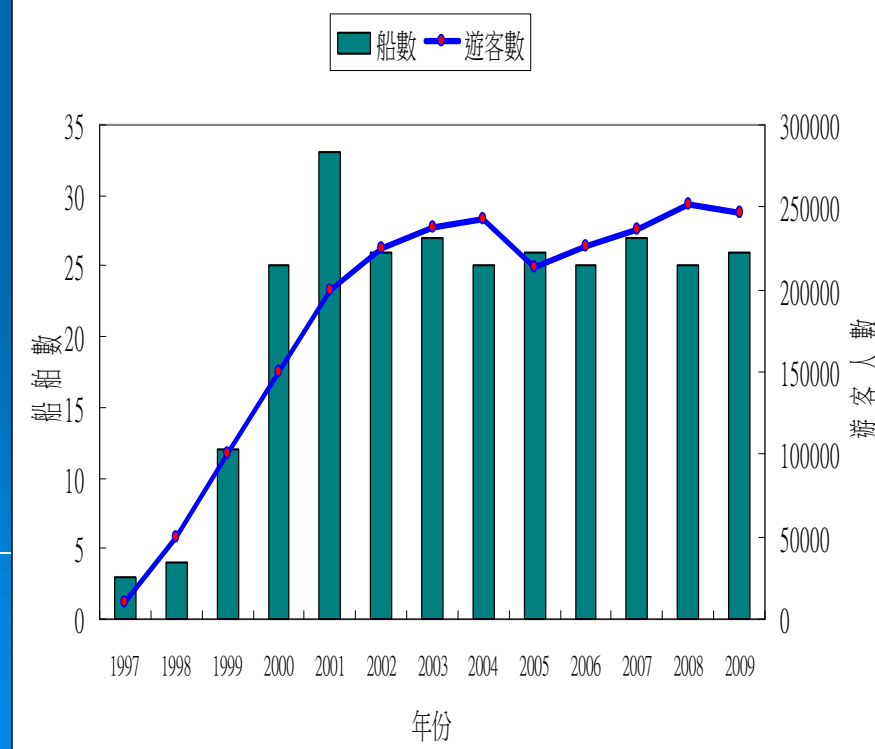
Status of Resource Utilization



Whale Watching Development in Taiwan



賞鯨遊客人數與船舶數統計表



Source : Butler(1980)



Research Method

- **Interviews** with experts and scholars of coastal management and local community representative.
- Set environmental sustainability, industrial development and social justice as **analysis dimensions**.
- Use **Delphi Method** to design the questionnaire for expert and stakeholders to get their attention factors and satisfaction on MSP and Community Renaissance.
- Finally, **Factor Analysis** to identify important key factors.

Questionnaire Response

Participant		Provide #	Receive #	Effective #	Effective rates
Experts and scholars		25	23	23	92%
Stakeholders	Fishermen	23	22	10	43%
	Fishmen Association	4	4	4	100%
	Whale-Watching	5	5	5	100%
	Volunteer	3	3	3	100%
	total	35	34	22	63%
Grand Total		60	57	45	75%

Perspective Target Construction (1)

- **A. Environmental and ecological sustainable**
 - **a. Natural resource**
 - 1. The uniqueness of endemic species (Aa1)
 - 2. Diversity of marine life (Aa2)
 - 3. Marine fishery resource abundance (Aa3)
 - 4. Particularity of submarine volcanic geology (Aa4)
 - 5. Coral reef habitats of the original (Aa5)
 - **b. Landscape maintenance**
 - 1. Marine pollution monitoring (Ab1)
 - 2. Artificial reduction in coastal and landscape (Ab2)
 - 3. Ruins and fishing village beautification (Ab3)
 - 4. Turtle Island history and animal and plant maintenance (Ab4)
 - 5. Unique intertidal ecology of original (Ab5)
 - **c. Use continuing forever**
 - 1. Artificial reefs settlement (Ac1)
 - 2. Marine protected area designation (Ac2)
 - 3. A forbidden fishing zone (phase) monitoring (Ac3)
 - 4. Purpose of fishing vessel operations and network restriction (Ac4)
 - 5. Fish fry releasing and ecological assessment (Ac5)

Perspective Target Construction (2)

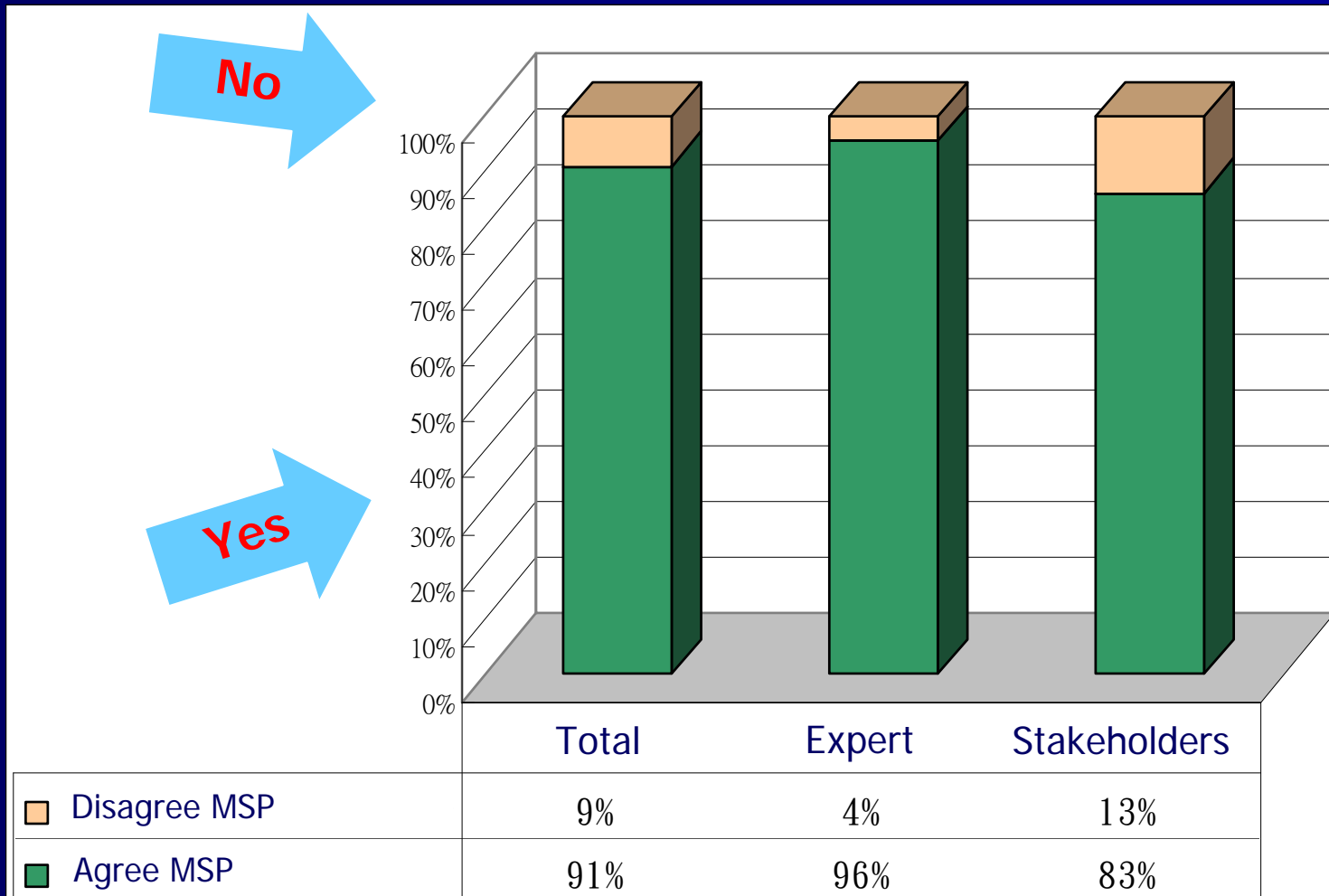
- **B. Industrial economic development**
 - **a. Traditional industry**
 - 1. Stability of traditional fishery income (Ba1)
 - 2. Set-fisheries exploitation and utilization (Ba2)
 - 3. Coast capturing business planning management (Ba3)
 - 4. Total amount of coral reef fishery capture control (Ba4)
 - 5. Fishing port and tourist fish market transformation (Ba5)
 - **b. Innovation industry**
 - 1. Blue highway construction (Bb1)
 - 2. Marine Aquarium and museum management (Bb2)
 - 3. Diversification of fishing village and fishing port (Bb3)
 - 4. Fishermen's brand product development (Bb4)
 - 5. Marine research and development of green energy industry (Bb5)
 - **c. Leisure service**
 - 1. Island tour guide professional (Bc1)
 - 2. Self guided bike path is located (Bc2)
 - 3. Local hand-made arts advocacy and succession (Bc3)
 - 4. Diversification of Riviera Beach leisure activities (Bc4)
 - 5. Marine and recreation industry (yacht) comfort (Bc5)

Perspective Target Construction (3)

- **C. Social equity**
 - **a. Community development**
 - 1. Community urging the establishment and training (Ca1)
 - 2. Promotion of Community transit and infrastructure (Ca2)
 - 3. Capacity of the community from the bottom up construction (Ca3)
 - 4. Community care and conditions of health in strengthening (Ca4)
 - 5. Residents cleaning beaches and fishing port of initiative (Ca5)
 - **b. Policy and law**
 - 1. Sea recreation area tourist volume control (Cb1)
 - 2. Sea area of open space activities Act (Cb2)
 - 3. Management of whales and dolphins watching (Cb3)
 - 4. Marine environmental education policy to promote (Cb4)
 - 5. Top down government policy support (Cb5)
 - **C. Cultural inheritance**
 - 1. Reservations to fishing village life and customs (Cc1)
 - 2. Education of cultural and creative industries (Cc2)
 - 3. Poseidon Temple and celebration of cultural continuity (Cc3)
 - 4. Fishermen's knowledge network strengthening (Cc4)
 - 5. Scheme in combination with local activities (Cc5)

Empirical Analysis

■ Agree Ment on Marine Spatial Planning



Key factors analysis of importance and satisfaction

All Participant

Perspective	Importance	Placing	Perspective	Satisfaction
Ba3 Coast management	4.324	1		
Ac2 MPA designation	4.189	5	Ac1 Artificial reefs	3.324
Ac3 Fishing zone monitoring	4.162	7		
Cb2 Activities Act	3.757	22		
		40	Cb2 Activities Act	2.647
		41	Ac2 MPA designation	2.618
		42	Ba3 Coast management	2.559
		43	Ac3 Fishing zone monitoring	2.500
Ac1 Artificial reefs	3.162	44		

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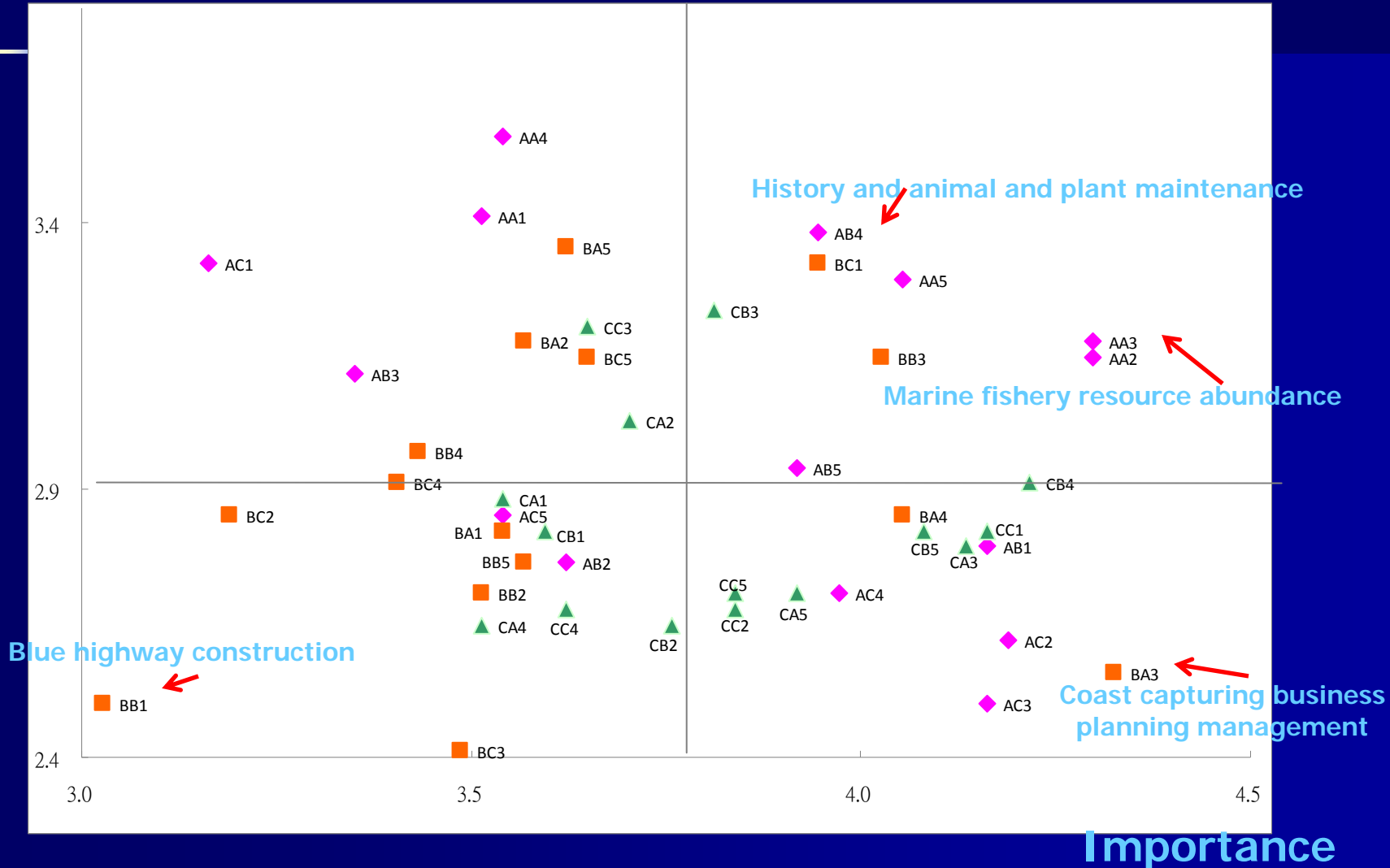
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Cross analysis of importance and satisfaction

Satisfaction



Factor Analysis

■ A. Environmental and Ecological Sustainable

Project	Factor Loading	Eigenvalue	Proportion	Cumulative Proportions
Principal components 1: Biodiversity conservation				
Ac1	0.828	4.704	39.197	39.197
Aa1	0.797			
Ab3	0.788			
Aa4	0.771			
Ab4	0.743			
Ac5	0.717			
Ab2	0.714			
Aa2	0.620			
Principal components 2: Marine environmental resource control				
Ac3	0.818	2.497	16.646	48.189
Ab5	0.755			
Ac4	0.734			
Ab1	0.588			

Factor Analysis

■ B. Industrial Economic Development

Project	Factor Loading	Eigenvalue	Proportion	Cumulative Proportions
Principal components 1: Sightseeing and recreation building				
Bb1	0.838	2.541	21.177	21.177
Bb4	0.748			
Bc5	0.675			
Bc2	0.568			
Principal components 2: Ecology and tourism management				
Ba4	0.804	2.496	20.798	41.975
Bc1	0.709			
Ba3	0.664			
Ba2	0.626			
Principal components 3: Industrial heritage and innovation				
Bb2	0.803	2.443	20.359	62.334
Ba5	0.737			
Ba1	0.714			
Bc3	0.691			

Factor Analysis

■ C. Society's Fair Justice

Project	Factor Loading	Eigenvalue	Proportion	Cumulative Proportions
Principal components 1: Autonomous community development				
Cb1	0.787	3.174	26.452	26.452
Cc3	0.776			
Ca1	0.739			
Cc2	0.717			
Principal components 2: Sustainable tourism and network platform construction				
Cb3	0.797	2.750	22.914	49.367
Cc5	0.793			
Ca2	0.636			
Cb4	0.546			
Cc4	0.441			
Principal components 3: Policy Act to support and release rights				
Cb5	0.805	2.011	16.762	66.129
Cb2	0.680			
Ca3	0.652			

Conclusion

- **MSP features diverse goals**
 - **MSP and community development can contribute to the conservation of the ecology of the marine environment, sustainable economic development of industry and the multiple goals of social equity and justice.**
- **MSP should consider all stakeholders' interest and provide participatory mechanism during the development**

■ **Key Factors of Turtle Island MSP**

■ **Environmental and ecological sustainable**

- **Biodiversity conservation**
- **Marine environment resource management**
- **Closed fishing zone monitoring**

– **Industrial economic development**

- **Sightseeing and recreation building**
- **Ecology and tourism management**
- **Industrial heritage promotion**

– **Social Justice**

- **Autonomous community development**
- **Sustainable tourism and network platform construction**
- **Policy support and rights decentralization**



Thanks and Comments

