An Assessment of the Marine Eco-civilization Performance in Oujiang River Estuary Area, Zhejiang, China

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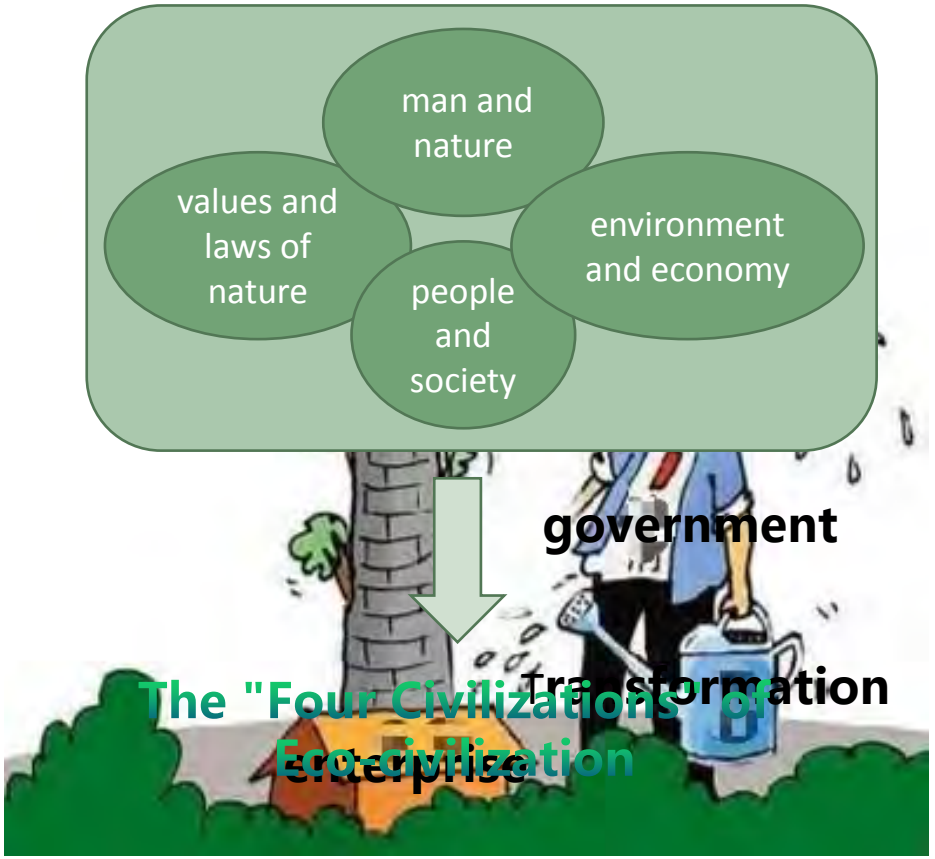
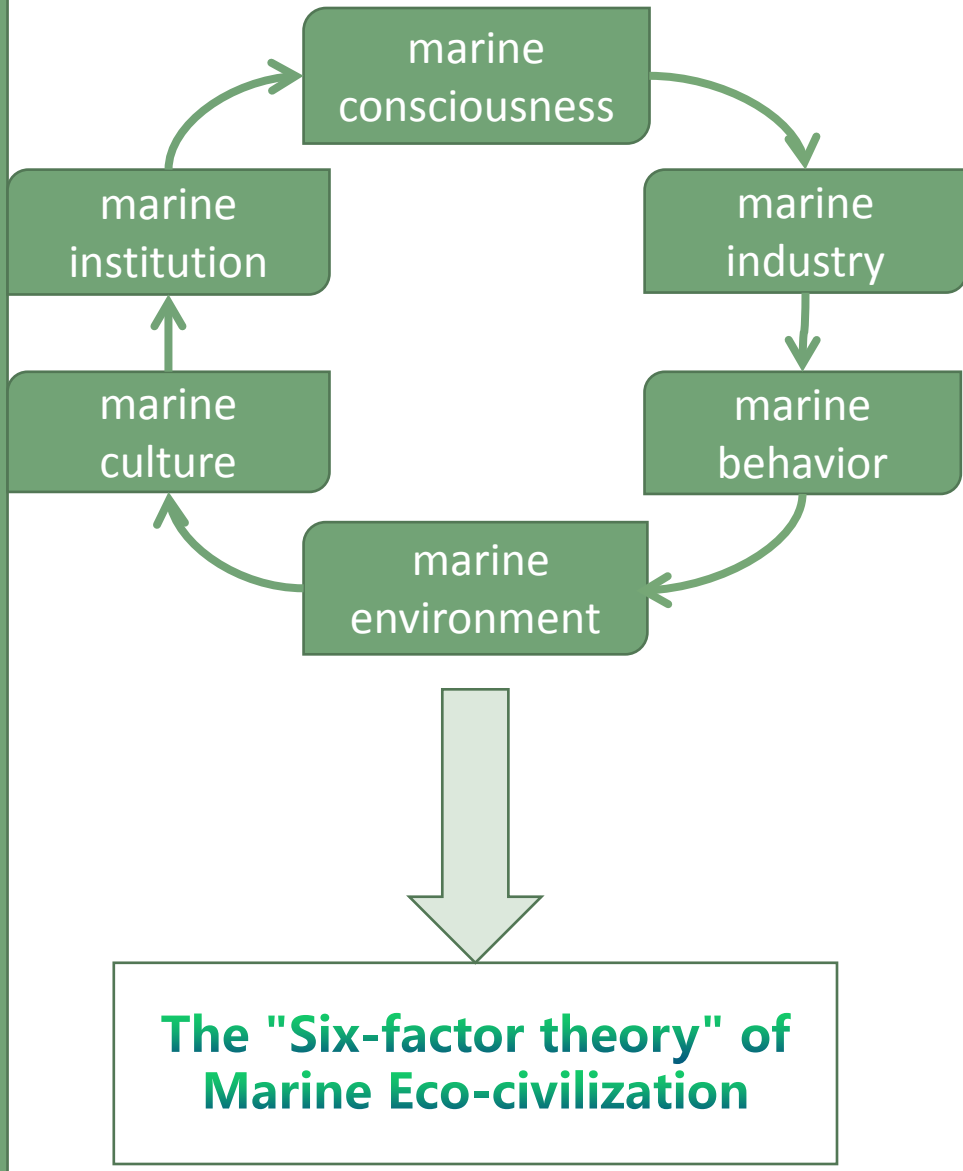
CONTENT

BACKDROUND

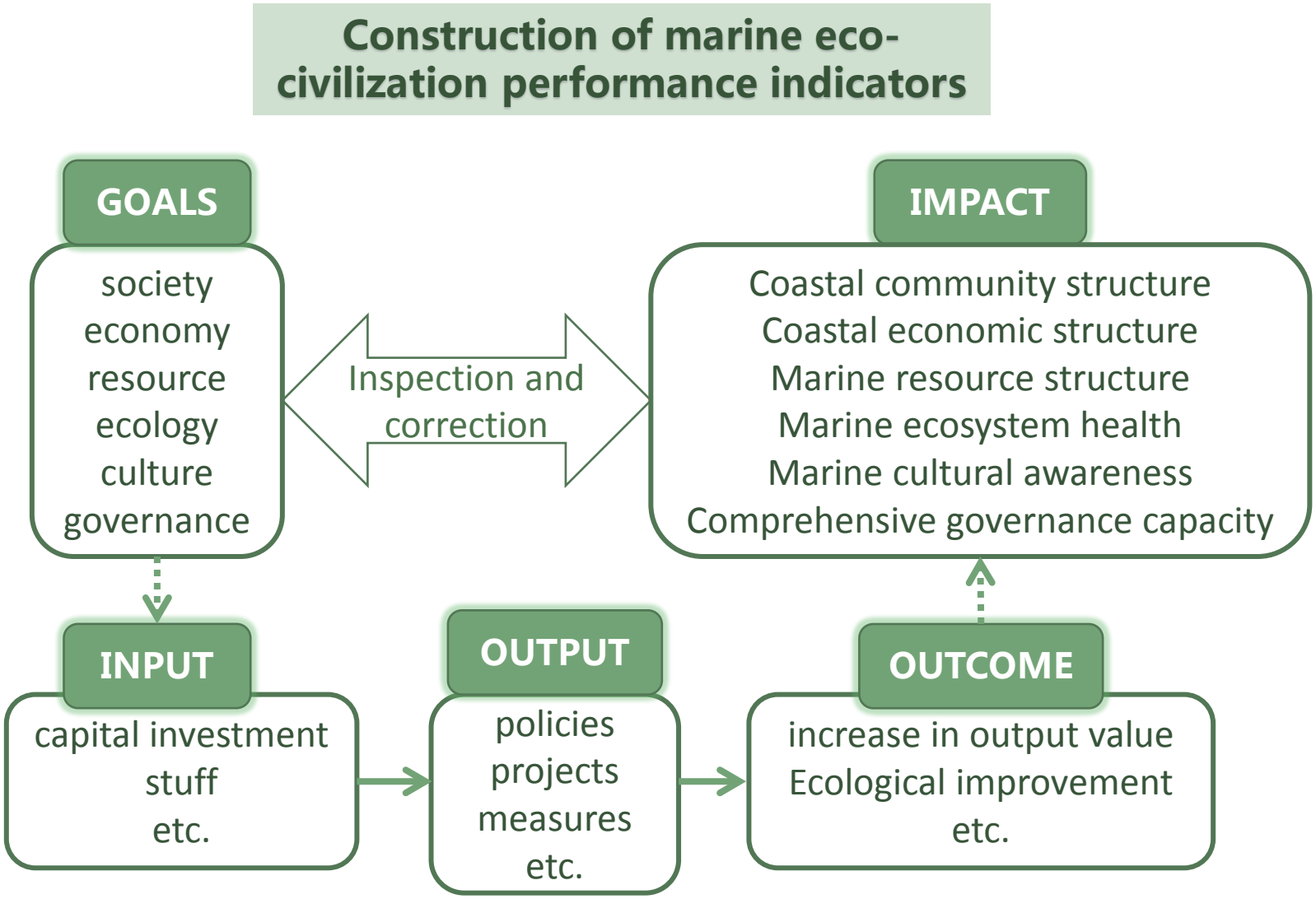
Eco-civilization refers to the sum of all the achievements of civilization achieved by mankind in the process of fully utilizing nature , respecting nature and using nature to serve human beings and realize the harmonious development between man and nature. This means a state in which humans and nature blend together.



- **2005　It was first proposed by the Chinese government.**
- **2012　The 18th CPC National Congress ： Integrating the construction of eco-civilization into the overall layout of the "five in one" of socialism with Chinese characteristics and strengthen China ‘s maritime development.**
- **2018　National Ocean Work Conference Held in Beijing.**



INDEX SYSTEM



conceptual model

INDEX SYSTEM

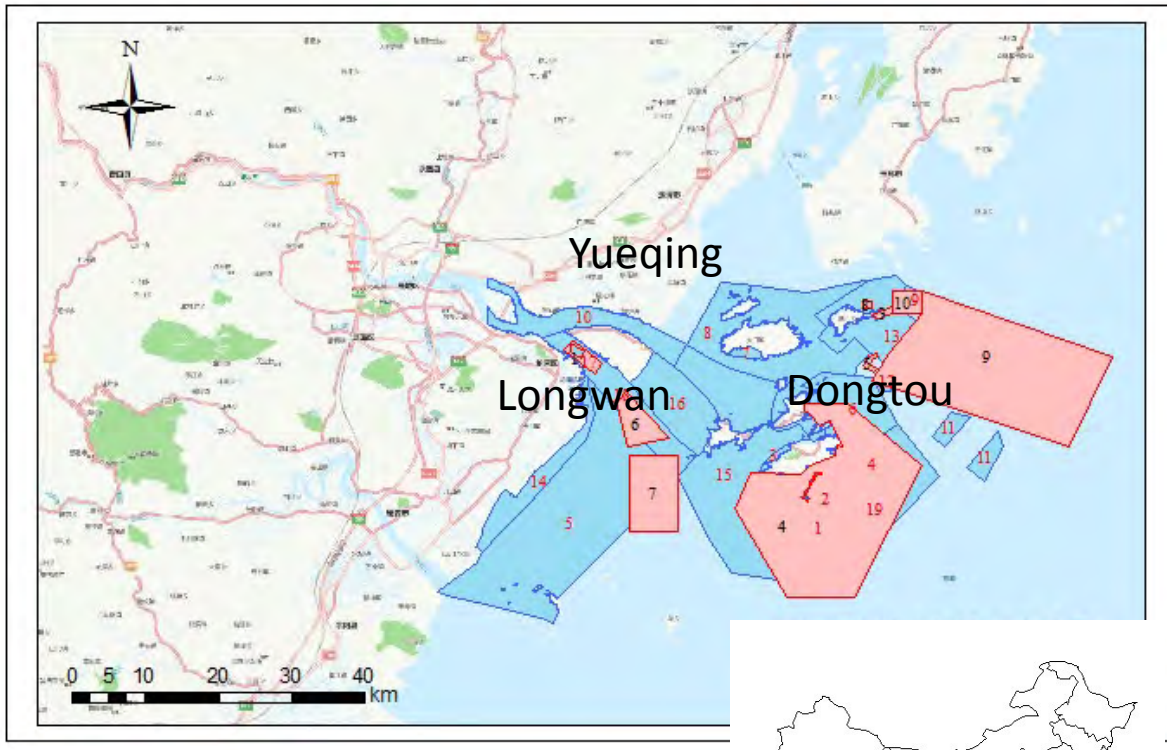
Subsystem	Sub-elements	Indicators
Governance (G)	Marine environmental early warning	Emergency-handling plan
		Environmental monitoring and forecasting system
	Marine institution	Marine management agency
		Marine management rules and regulations
	Marine service management	Marine supervision and enforcement

$$M = \sum_{i=1}^{n} \left(\frac{E_i}{E_s} \times w_i \right)$$

STUDY CASE

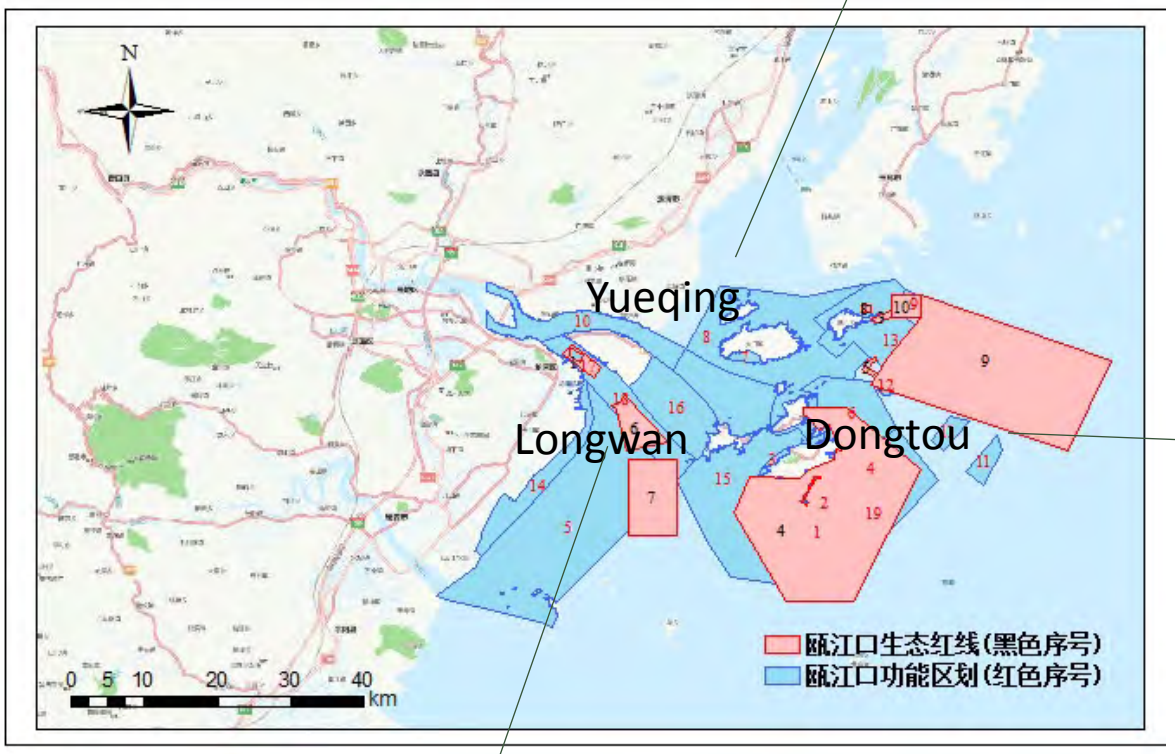
Located in Wenzhou City, a coastal city in **southeast China**, Oujiang Estuary is an important estuary in China.
The study area contains three administrative districts: Yueqing, Longwan and Dongtou.

The land area is: **1604** km^2, and the sea area is **2978.7** km^2.



Indicators	Dongtou	Yueqing	Longwan
Public ecological environment satisfaction	78.83%	65.50%	58.05%
Marine protection volunteer activities	Satisfied	Not Satisfied	Not Satisfied
University participation	Satisfied	Satisfied	Satisfied
Enterprise/Department participation	Satisfied	Satisfied	Satisfied
Ratio of marine industry production	55%	21.08%	16%
urban per capita disposable income	34700yuan	46400yuan	41600yuan
Regional energy consumption	/	/	/
Direct economic losses from coastal disaster	6.5 million yuan	22.14 million yuan	3.5 million yuan
Emergency-handling plan	Satisfied	Satisfied	Satisfied
Environmental monitoring and forecasting system	Satisfied	Not Satisfied	Not Satisfied
Marine management agency	Satisfied	Satisfied	Satisfied
Marine management rules and regulations	Not Satisfied	Not Satisfied	Not Satisfied
Marine supervision and enforcement effectiveness	Satisfied	Satisfied	Satisfied
Marine cultural heritage protection	Satisfied	Not Satisfied	Not Satisfied
Popularization of marine knowledge	Satisfied	Satisfied	Satisfied
Marine technology investment ratio	4.10%	/	5.43%
Marine technology project	20(directly)	/	6(indirectly)
Desalination	Not Satisfied	Not Satisfied	Not Satisfied
Percentage of reclamation area to total tidal-flat area	1%	3%	32%
Annual port's handling capacity	9520000tons	39900000tons	/
Zero growth in offshore fishing intensity	Not Satisfied	Satisfied	Satisfied
Number of visitors	448340000	12056000	2696900
Ratio of clean water area	0%	0%	0%
Ratio of Sediment quality area	54%	100%	55%
Frequency of red tide occurrences	0	0	0
Natural shoreline retention rate	/	/	/
Percentage of marine conservation area	320.02km^2	30.8km^2	2km^2
Wastewater treatment rate	87.01%	85.91%	86.80%
Coastal and island garbage disposal	76 tons	/	/

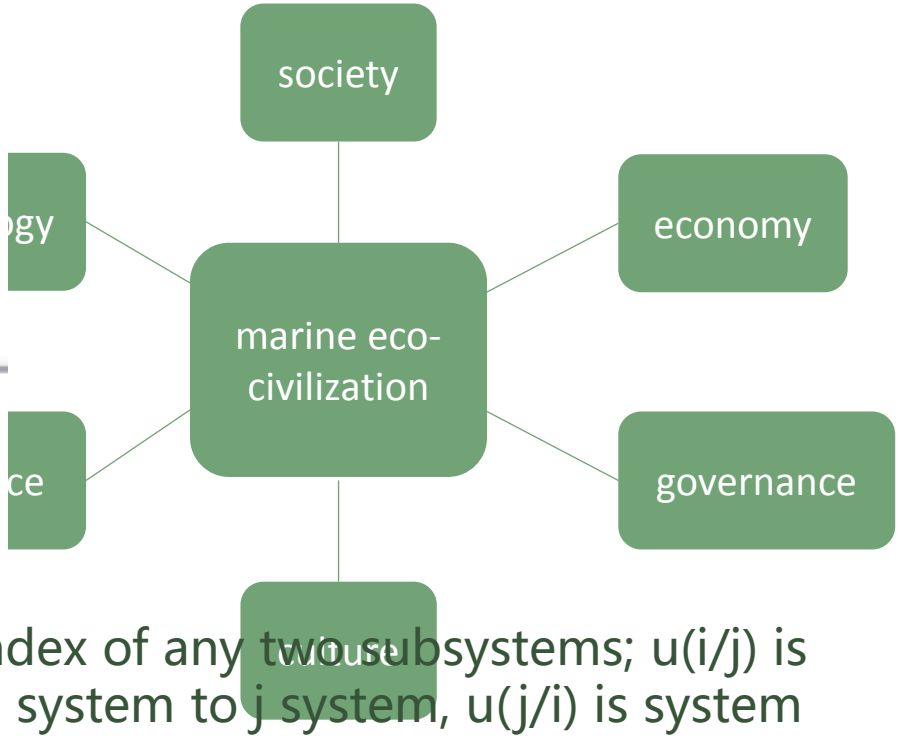
STUDY CASE——Result of 2015



SOMETHING STILL ON WORKING ...

$$U(i,j) = \frac{\min\{u(i/j)\ ,\ u(j/i)\}}{\max\{u(i/j)\ ,\ u(j/i)\}}$$

$$u(i,j) = \exp\left\{-\frac{(x-x')^2}{s^2}\right\}$$



U(i,j) is the development coordination index of any two subsystems; u(i/j) is the coordinated development fitness of i system to j system, u(j/i) is system j to system i coordinate the development of fitness.

x is the i system comprehensive performance index, x' is the comprehensive coordinated development index of the i system to the j system, and s2 is the i system index mean variance.

$$U(s,en,g,c,r,es) = \frac{\sum u(s/en,g,c,r,es) * u(en,g,c,r,es)}{\sum u(en,g,c,r,es)}$$

THANKS !

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