



# **Extend the System of Environmental-Economic Accounting to Oceans: a Chinese Perspective**

ZHAO PENG

FOURTH INSTITUTE OF OCEANOGRAPHY, MINISTRY OF NATURAL RESOURCES

# Background

## United Nations

### Sustainable Development Goals (SDG)



## China

### Ecological Civilization

lucid waters and lush mountains are invaluable assets





# Background

## United Nations

### The System of Environmental-Economic Accounting 2012 (SEEA 2012)



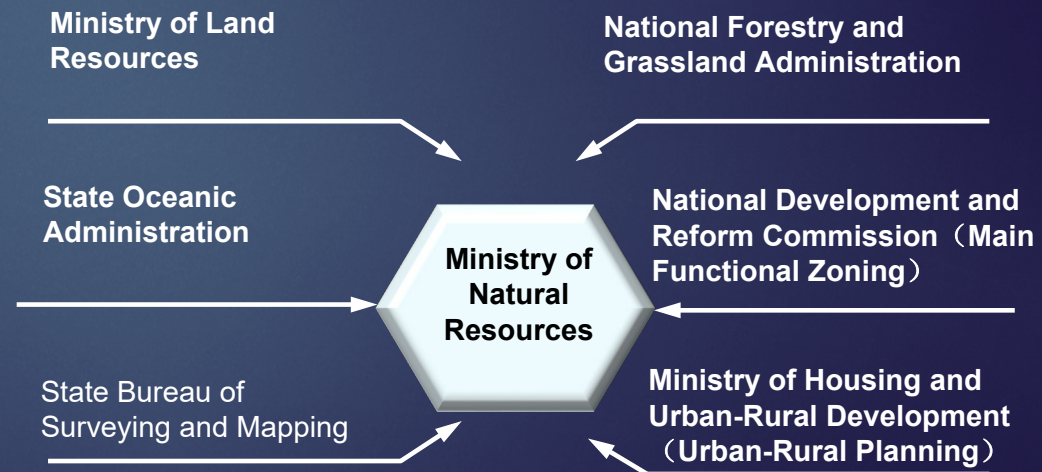
Central Framework



EEA

## China

### Natural Resources Assets Accounting

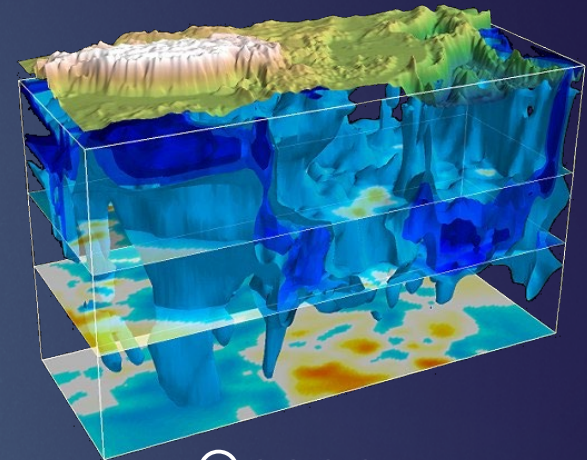


# Extending SEEA to the Oceans (not a easy task)



Forest 陆地森林

And



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Ocean

- ▶ **Dimensions variation**
- ▶ **Fluidity**
- ▶ **Data Availability**
- ▶ **Economic Activities between the land and the ocean**

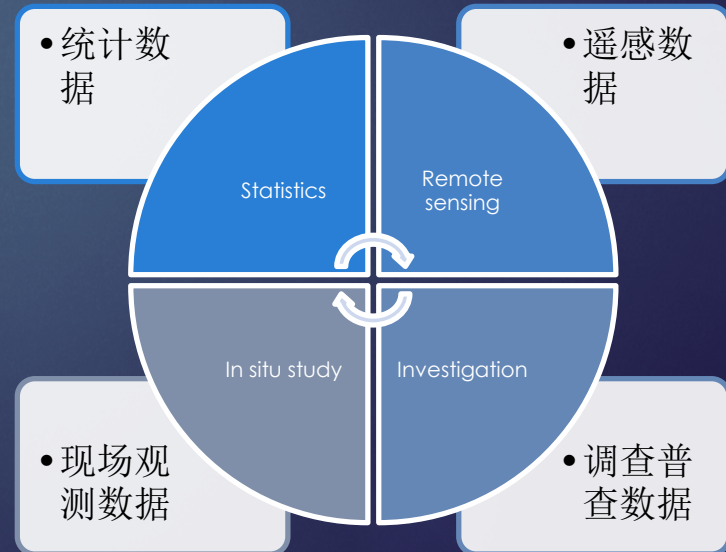


# Data Availability

	Sources 数据源	Space-time scales 时空尺度	Availability 可获得性
Land 陆地	<b>Satellite, Aircrafts, Social &amp; Economical Data</b> ...卫星、航空、经济社会数据等	<b>Submeters, meters Yearly, 5 years</b> 亚米、米级年度或5年	<b>Easier to acquire</b> 容易获取
Ocean 海洋	<b>Optic and Acoustic Survey &amp; Field Research</b> ...光学、声学、调查和野外研究	<b>Meters to kilometers Infrequent</b> 米到千米，不频繁	<b>Many data are classified</b> 很多数据涉密

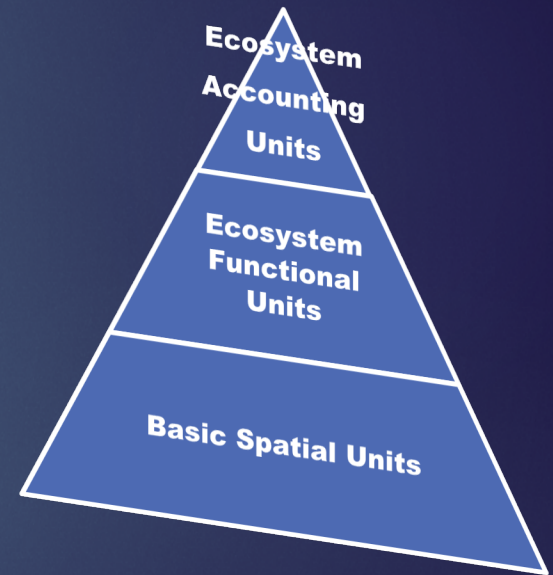
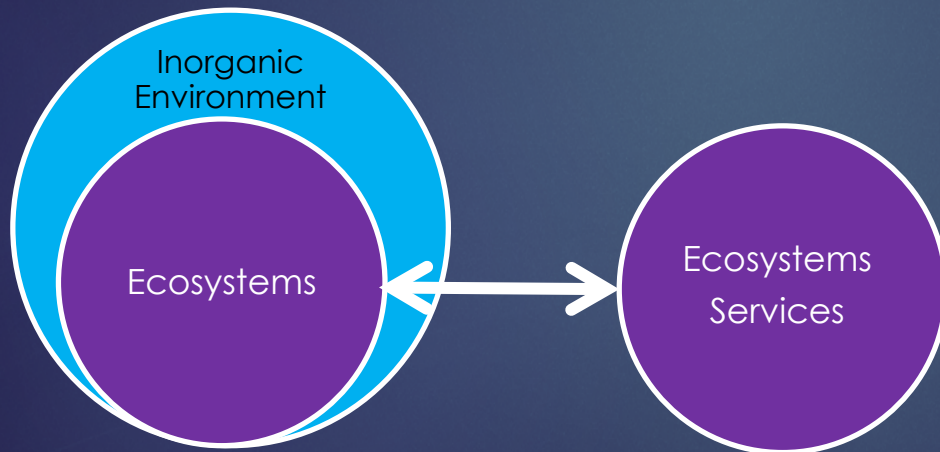
## Open-access statistics data

- China Marine Economic Statistical Bulletin
- China Marine Statistical Yearbook
- China Ocean Development Index
- China Ocean Economic Development Index
- Marine Economic Climate Index Report
- Report on China's marine Economy Development
- Bulletin of marine ecological environment status
- Statistical communique of national economic and social development
- Fisheries statistical yearbook



# Key Issues

## 关键问题



Spatial Units



# Oceanic Environmental Assets



## SEEA-2012 Environmental Assets

## Oceanic Environmental Assets

### **1 Mineral and energy resources**

### **Marine minerals and energy resources**

1.1 Oil resources

Offshore oil resources

1.2 Natural gas resources

Marine natural gas resources

1.3 Coal and peat resources

Submarine coal mine

1.4 Non-metallic mineral resources

Marine non-metallic mineral resources

1.5 Metallic mineral resources

Marine metal mineral resources

### **2 Land**

### **Sea area**

### **3 Soil resources**

### **Sediment and seawater nutrients**

### **4 Timber resources**

### **Marine higher plants**

4.1 Cultivated timber resources

Cultivated marine higher plants

4.2 Natural timber resources

Natural marine higher plants

### **5 Aquatic resources**

### **Marine living resources**

5.1 Cultivated aquatic resources

Cultivate marine living resources

5.2 Natural aquatic resources

Natural marine living resources

### **6 Other biological resources**

### **7 Water resources**

### **Marine freshwater resources**

7.1 Surface water

Sea ice

7.2 Groundwater

Input freshwater

7.3 Soil water

### **8**

Other

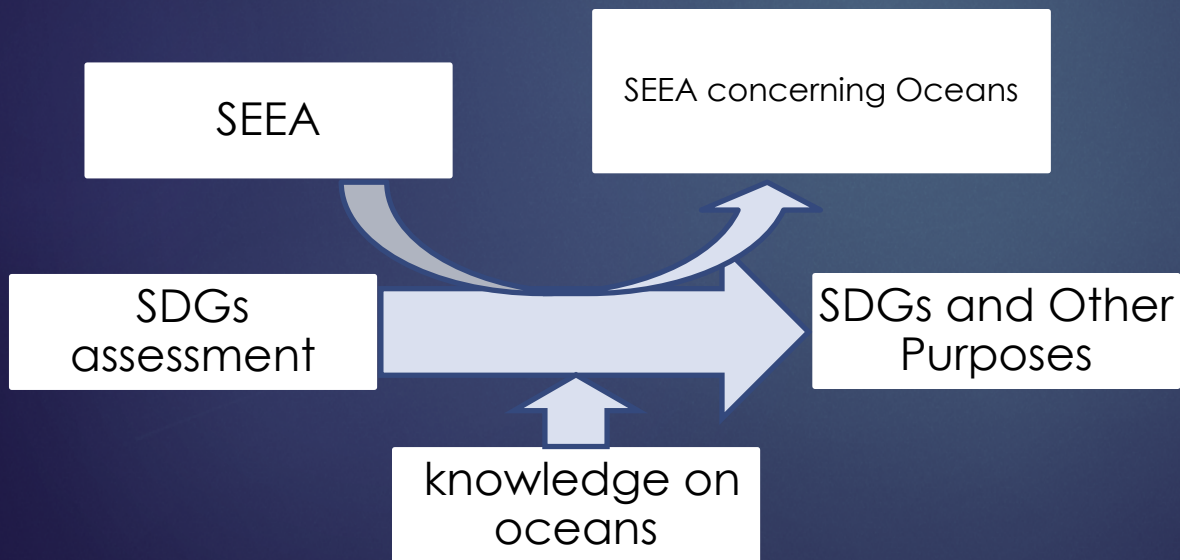
# Oceanic Ecosystem Services

Section	Division	Group	
Provisioning	Water	水 捕捞的食用海洋植物、藻类和动物 养殖生物营养和饲料	
	Materials	动植物纤维和结构 动植物天然产物 基因	
		Energy	生物质能
		Other	其他
	Regulating	biophysical environment	生物调节 污染物的稀释过滤和沉降
Flow			气流调节 水流调节 物质流动调节 大气调节
		physicochemical environment	水循环调节 土壤循环 噪声调节
			biotic environment
		Cultural	Physical or experiential use
Intellectual representations			精神和象征 不利用



# the Effort to Account the Oceans

Strengthening data partnerships for Oceans in Asia and the Pacific by United Nations Economic and Social Commission for Asia and the Pacific (ESCAP).



The screenshot shows the ESCAP website for an event titled "Asia and the Pacific Regional Expert Workshop on Ocean Accounts". The event is scheduled for 1 AUG 2018 TO 3 AUG 2018 in BANGKOK, THAILAND. The page includes a navigation menu with "Home" and "Events" highlighted. On the right, there are sections for "Support Materials" (Concept Note, Agenda), "Contact" (Statistics Division), and "Telephone: +66 2288 1234". The main content area features a graphic for "OCEAN ACCOUNTS PARTNERSHIP" and "OCEAN ACCOUNTS PLATFORM" with the tagline "ACTION FOR OUR OCEAN". Below the graphic, the text states: "Based on our Assessment of capacity development needs of the countries in Asia and the Pacific for the implementation of Sustainable Development Goal 14, the region needs strengthening of technical capacity, coordination, governance, data and statistics, awareness, stakeholder engagement and partnerships. Vital information to monitor and evaluate progress towards SDG 14 is available, but it is fragmented across scientific domains, policy".

The screenshot shows the ESCAP website for an event titled "Global Dialogue on Ocean Accounting and First Annual Meeting of the Global Ocean Accounts Partnership". The event is scheduled for 12 NOV 2019 TO 15 NOV 2019 in SYDNEY, AUSTRALIA, and is "BY INVITATION ONLY". The page includes a navigation menu with "Home" and "Events" highlighted. On the right, there is a "Contact" section for the "Statistics Division" with "Telephone: +66 2288 1234" and "Email: stat.unescap@un.org". The main content area features the text: "Organizers: Co-hosted by the University of New South Wales (UNSW) and United Nations Economic and Social Commission for Asia and the Pacific (ESCAP), supported by the World Bank Blue Economy Program. The ocean is the life source of our planet, and a critical foundation of social and economic development. All countries have committed to conserve and sustainably use the ocean by 2030, and a growing number have established ambitious strategies to develop their ocean economy."

# Progress of China's Pilot Study

**Aug 2018, Bangkok  
Asia and the Pacific Regional Expert  
Workshop on Ocean Accounts**



**May 2019, Beijing  
First Workshop for the Pilot Study of  
ESCAP Ocean Accounting in China**



**Sep 2019, Beihai  
Second Workshop for the Pilot Study of  
ESCAP Ocean Accounting in China**





# Stakeholders Identification

## Laws

No	Laws and Regulations	Years
1	Law of the People's Republic of China on the Territorial Sea and the Contiguous Zone	1992
2	Law on the Exclusive Economic Zone and the Continental Shelf of the People's Republic of China	1998
3	Environmental Protection Law of the People's Republic of China	2014 *
4	Marine Environment Protection Law of the People's Republic of China	2017 *
5	Law of the People's Republic of China on Environmental Impact Assessment	2018 *
6	Island Protection Law of the People's Republic of China	2009
7	Law of the People's Republic of China on the Administration of Sea Areas	2001
8	Fisheries Law of the People's Republic of China	2013 *
9	Wild Animal Conservation Law of the People's Republic of China	2018 *
10	Mineral Resources Law of the People's Republic of China	2009 *
11	Law of the People's Republic of China on the Exploration and Development of Resources in Deep Seabed Areas	2016
12	Waterway Law of the People's Republic of China	2016
13	Law of the People's Republic of China on Ports	2018 *
14	Statistics Law of the People's Republic of China	2010 *
15	Regulations of the People's Republic of China on Nature Reserves	2017 *

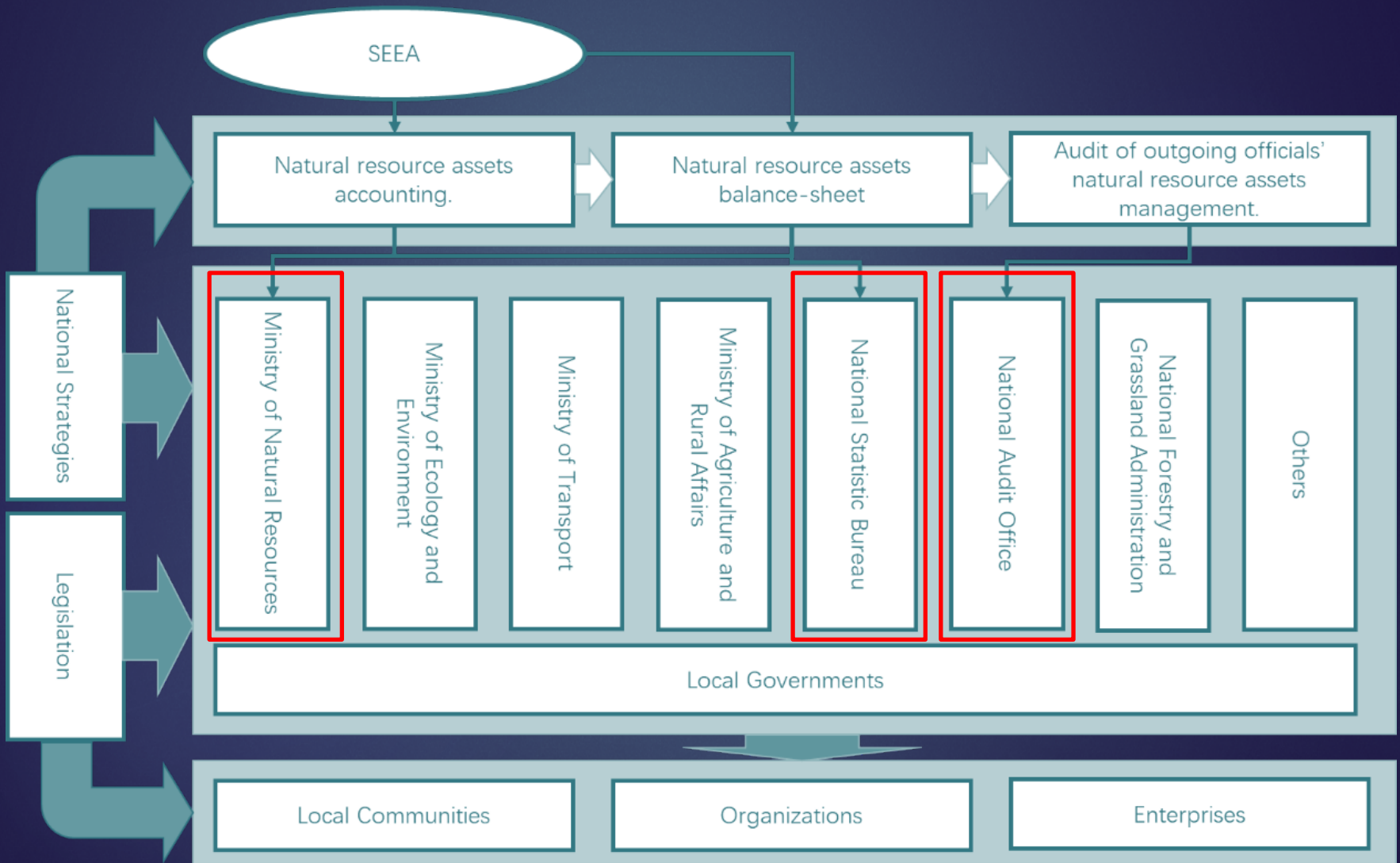
## National Strategies

- Ecological civilization
- Building China into a maritime power

## Policy Tools

- Natural resource assets accounting
- Natural resource assets balance-sheet
- Audit of outgoing officials' natural resource assets management

# Stakeholders Identification



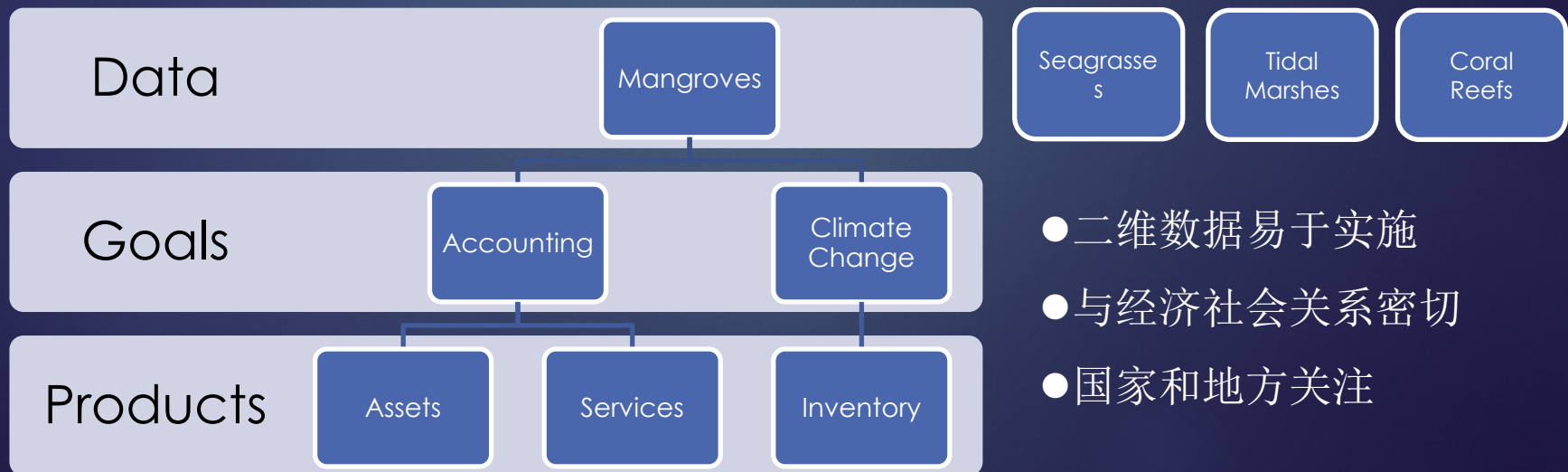


# Recommendations for China

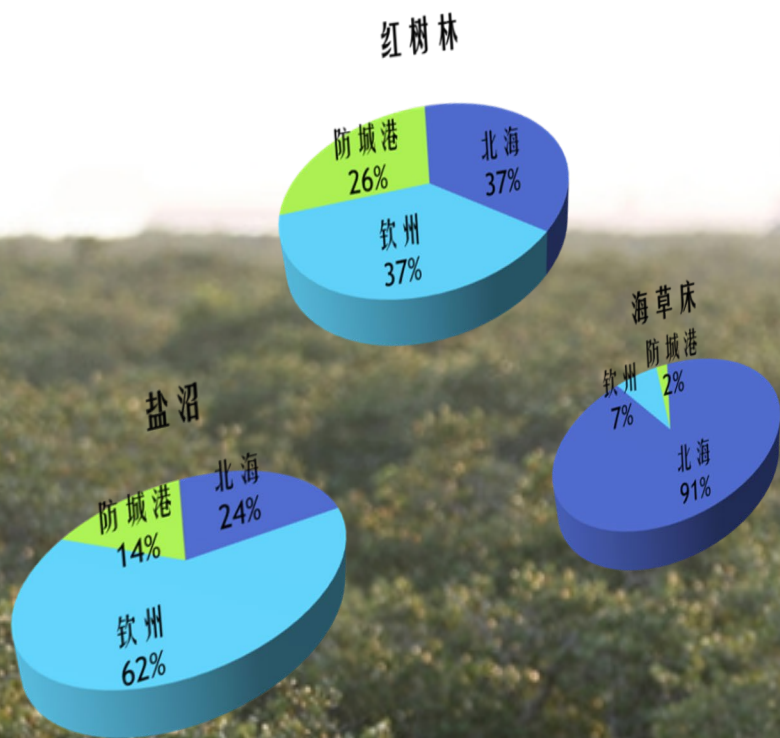
- ▶ (1) Adding oceanic resources into NRAA for urgent needs and directions of natural resources management, e.g., the spatial resources, aquatic resources, and coastal ecosystems and aquatic wildlife.
- ▶ (2) Establishing oceanic resource assets accounts basing on the SEEA.
- ▶ (3) Establishing a 3-D data framework
- ▶ (4) Establishing practical data acquisition methods for the ocean, and the methods for scaling up and down archive data.
- ▶ (5) Initiating pilot studies and periodic accounting in a relatively small scales such as a habitat, a city or a county.
- ▶ (6) Promoting regional and international cooperation under UN, the Belt and Road, South-South cooperation, Sino-Asian Maritime Cooperation Fund.

# Pilot study

- ▶ Principles: easy to start, local support, multiple targets, wide application
- ▶ Site: Beihai, Guangxi
- ▶ Content: mangroves assets and ecosystem services







Apr. 19, 2017, President Xi Jinping visited in Beihai Golden Bay Mangrove Reserve, and asked to study and conserve rare plants, and enhance the biodiversity of coastal wetland reserve.



# Distribution of Mangrove in Beihai





# Pilot study: Environmental/Natural Assets of Mangrove

Water Purification and Primary Production

National Green House Gases Inventory (Blue Carbon)

Eco products and Restoration

Biodiversity Conservation and Fishery Enhancement

Key factor for Mangroves

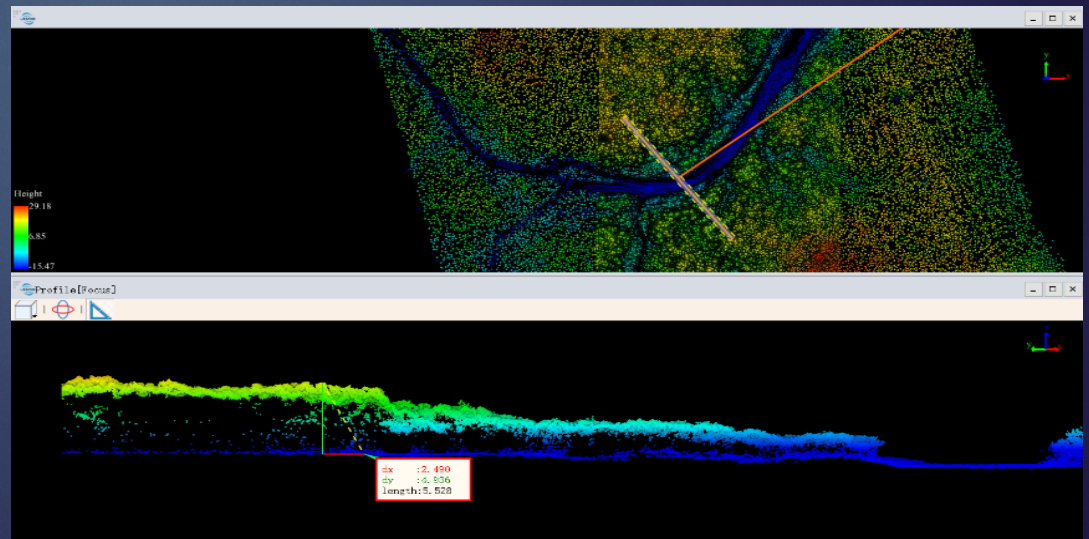
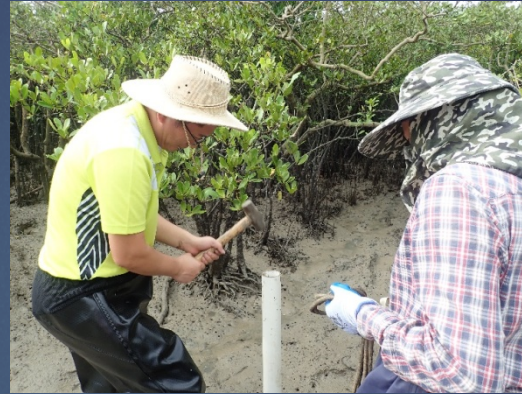
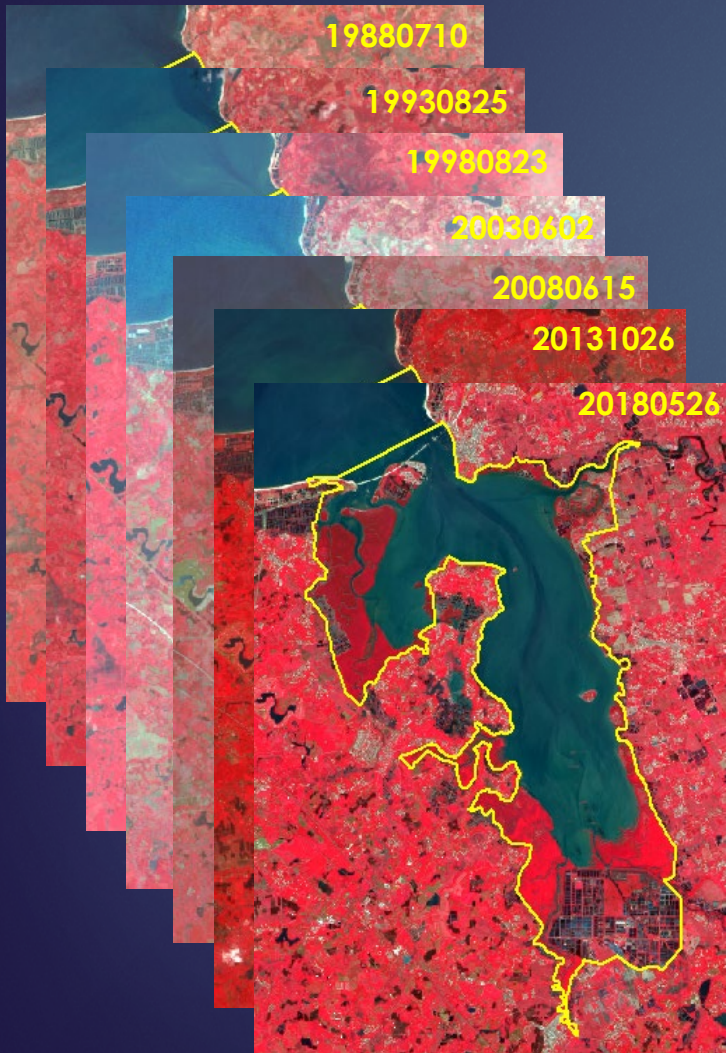
2	Sea area	
2.1	Mangrove area	Remote Sensing and Ground Truthing
3	Sediment and seawater nutrients	
3.1	Sediment	On-site sampling × areas
3.1.1	Carbon	
3.2	Nutrients	On-site sampling × areas
3.2.1	Nitrogen	
3.2.2	Phosphorus	
	.....	
4	4 Marine higher plants	
4.1	Cultivated Mangrove Biomass	Remote Sensing and Experimental Formula Estimation
4.2	Natural Mangroves Biomass	Remote Sensing and Experimental Formula Estimation
5	Marine living resources	
5.1	Cultivate marine biomass	On-site sampling × areas
5.1.1	Crab	
	.....	
5.2	Natural marine living resources	On-site sampling × areas
5.2.1	Crab	
5.2.2	Fish	
5.2.3	Bird	
	.....	
6	Marine freshwater resources	
6.1	Input freshwater Flux	Monitoring Data
6.1.1	River Flux	
6.1.2	Rain Flux	
6.1.3	Underground Water Flux	

# Pilot study: Ecosystem Services of Mangrove

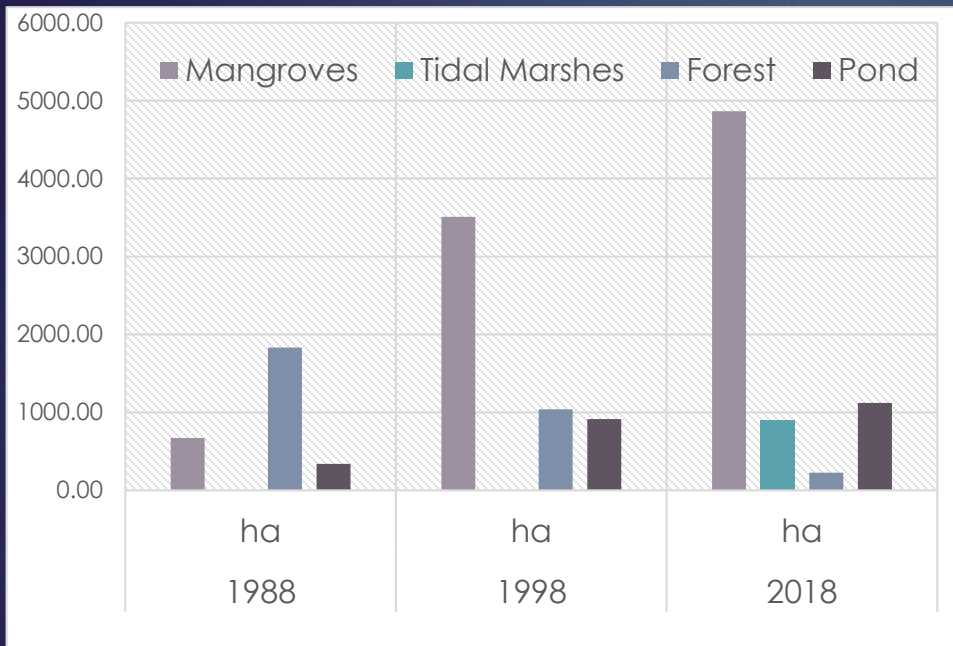
Section	Division	Group
Provisioning	Materials	Captured edible plants and animals
		Plants and animals' fiber and structure
		Natural product
		Gene
		Bio-energy (right but not recommended)
Regulating	biophysical environment	Bio regulation
		Pollutant filter and carbon sequestration
	Flow	Air regulation (disaster reduction)
		Water regulation(disaster reduction)
		Material regulation(erosion reduction)
	physicochemical environment	Atmosphere regulation (Oxygen production)
		Water cycle regulation
		Soil cycle regulation
Cultural	biotic environment	Life history, habitat and gene pool conservation
		Disease and pest control
	Physical or experiential use	tourism
		Knowledge and Sciences
	Intellectual representations	Spirit and Religion



# Data Acquisition



# Areas



- ▶ Mangroves are increasing
- ▶ Invaded tidal marshes are increasing
- ▶ Ponds is increasing slowly

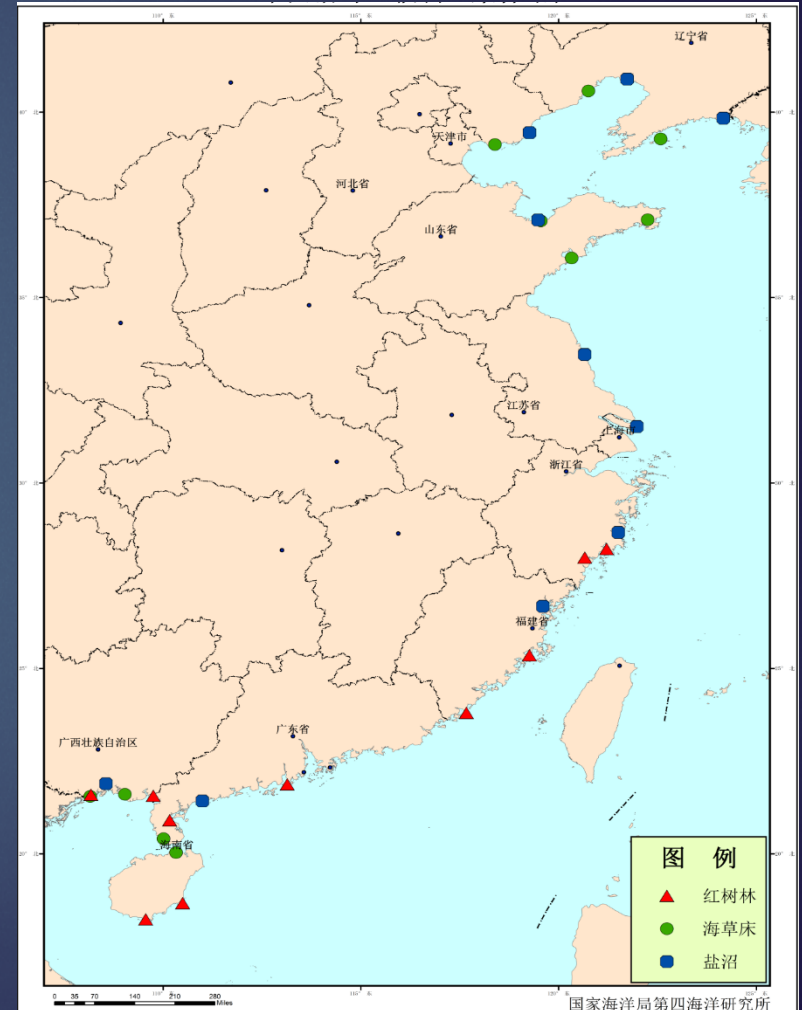
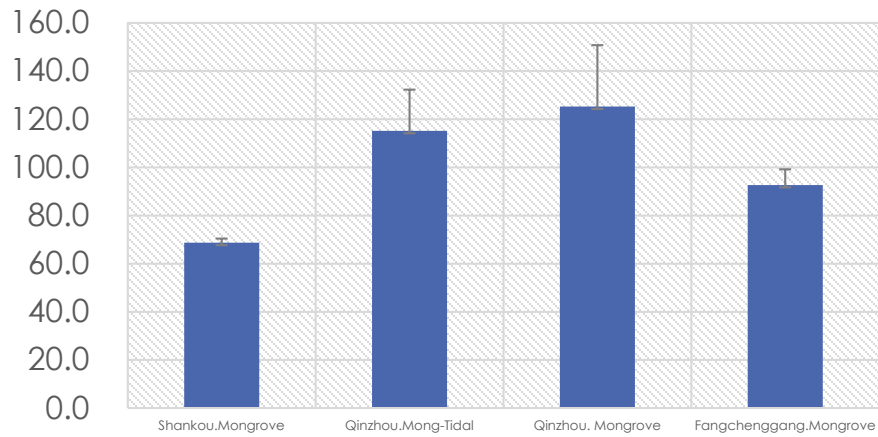
		1988				
		Mangroves	Tidal Marshes	Forests	Ponds	Total
1998	Mangroves	499.56	0.00	225.38	12.56	737.51
	Tidal Marshes	0.00	0.00	0.00	0.00	0.00
	Forests	11.76	0.00	618.57	7.33	637.65
	Ponds	82.49	0.00	203.98	48.90	335.37
	total	593.81	0.00	1047.93	68.79	

		1998				
		Mangroves	Tidal Marshes	Forests	Ponds	Total
2018	Mangroves	2340.24	0.00	209.77	99.08	2649.08
	Tidal Marshes	105.91	0.00	5.02	14.29	125.21
	Forests	31.12	0.00	78.18	7.78	117.08
	Ponds	152.32	0.00	61.55	166.37	380.24
	total	2629.58	0.00	354.52	287.52	



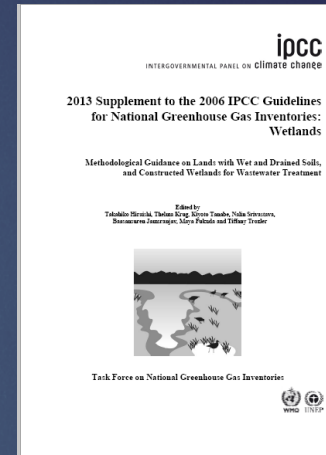
# In-situ sampling

- ▶ Soil: Average 100t C/ha
- ▶ 0.3 million t Soil C in Beihai
- ▶ 0.6 million t C in mangrove in Beihai

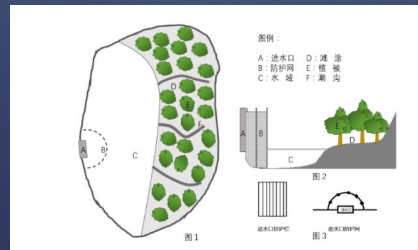
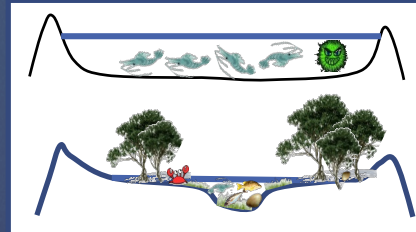


# More than accounting

- ▶ Blue Carbon Inventory and investigation
- ▶ China
- ▶ A part of ocean accounting
- ▶ Climate mitigation and adaptation



- ▶ Abandoned shrimp pond restoration
- ▶ Beihai China
- ▶ Increase natural assets and enhance eco services
- ▶ Climate mitigation and adaptation







**Thank you for your attention**

**Email: [zp-zp@163.com](mailto:zp-zp@163.com)**

**Focusing on Ocean Accounting, Blue Carbon  
Coastal habitat Restoration**