



21st-Century
Maritime Cooperation
Committee
21世纪海上合作委员会

Online Workshop on Marine Litter Management
August, 2021 | Fuzhou, China



Xiamen' s Experience on Marine Litter Management: From a Perspective of Integrated Coastal Management (ICM)

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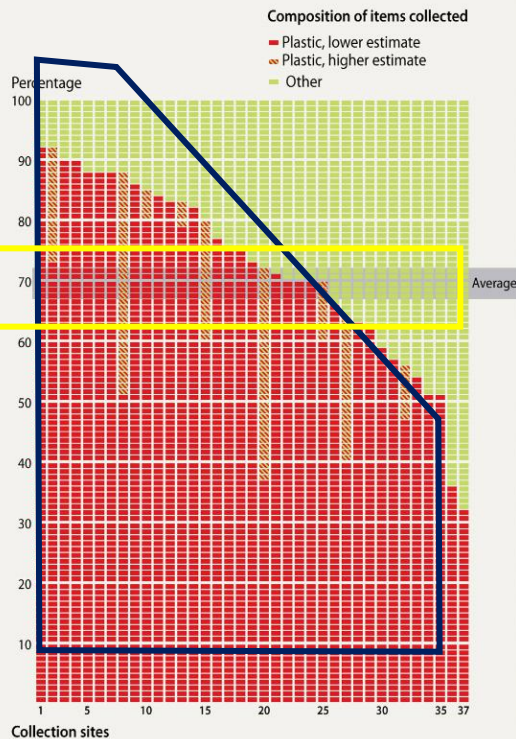
Marine litter as a global issue

Integrated Coastal Management (ICM) experience in Xiamen

Xiamen's practice on marine litter management

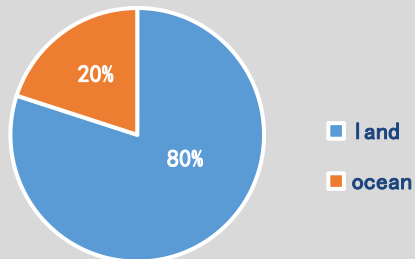
• Marine litter as a global issue

Mostly plastic



Plastic accounts for **70%** of marine debris (<http://www.grida.no/resources/6926>)

Sources of marine plastic



UNITED NATIONS



United Nations
Environment Assembly of the
United Nations Environment Programme

United Nations Environment Assembly of the
United Nations Environment Programme
Third session
Nairobi, 4-6 December 2017

EP

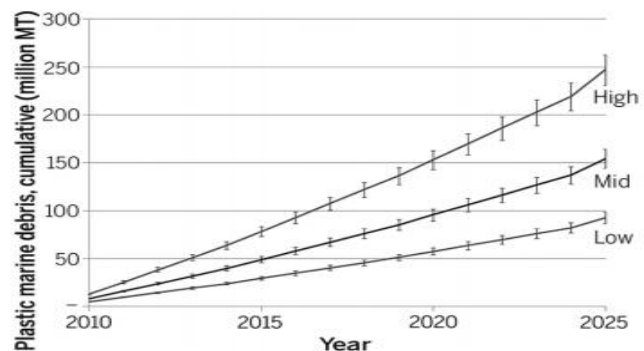
UNEP/EA.3/Res.7

Distr.: General

30 January 2018

Original: English

3/7. Marine litter and microplastics

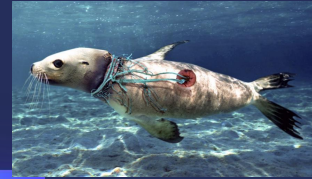


2025: The amount of plastic in the ocean will more than double from 2010 (Jambeck, et al., 2015)

Marine litter---Global pollution problem

- ◆ Global-scale issues on economic, political and environmental
- ◆ Damaging ecosystems, threatening public health, and affecting economic development
- ◆ Mainly plastic and difficult to degrade
- ◆ Microplastics: a threat to biological health

• The negative impacts of Marine Litter



Ecological impacts

- Marine animals - trapped or ingested
- Habitat destruction
- Accumulation of toxins in food chain
- Introduction and spread of invasive species

- 2003~2007 Collected from 1,295 Northern fulmars, 95% of which contained an average of 36 plastics in their stomachs, each containing items weighing 0.31g

Economic impacts

- Reduce the benefits of ocean and coastal activities like fishery industry, coastal tourism
- Increase the cost of ocean activities, like cleaning up, salvage

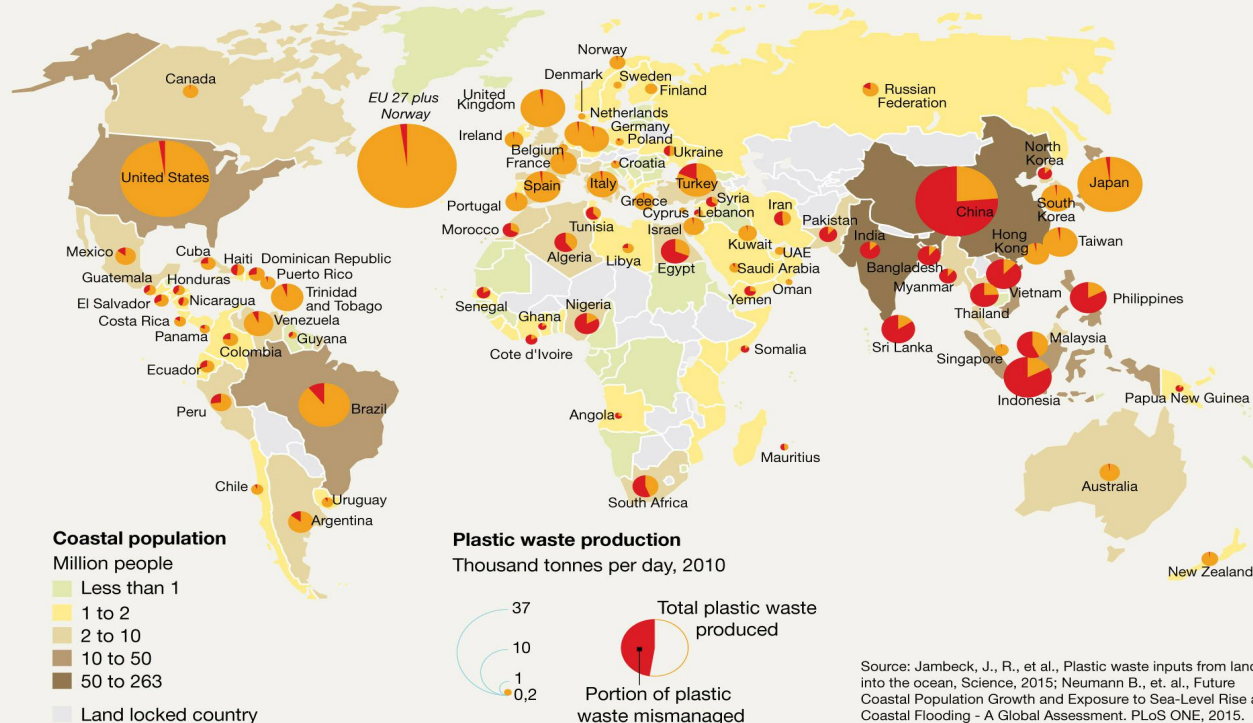
- In June 2014, The first United Nations Conference on Environment: Marine garbage caused economic losses as high as \$13 billion

Social impacts

- Destruction of coastal landscape
- On October 1 2012, Dadonghai Scenic spot Sanya, Hainan province: After the Mid-Autumn festival, the tourists left more than 50 tons of garbage on the coastal area

Picture source: Laurie K. Wilson, Lydia Kleine, Stephanie Avery-Gomm, et al. Northern fulmars as biological monitors of trends of plastic pollution in the eastern North Pacific[J]. Marine pollution bulletin, 2012, 64(9):1776-1781.

Plastic waste produced and mismanaged



- Some studies show that the coastal Asian countries contribute the largest source of plastic flowing from land into the sea
- China accounts for nearly a third of the total emissions from 192 coastal countries and regions

Rank	Country	Econ. classif.	Coastal pop. [millions]	Waste gen. rate [kg/ppd]	% plastic waste	% mismanaged waste	Mismanaged plastic waste [MMT/year]	% of total mismanaged plastic waste	Plastic marine debris [MMT/year]
1	China	UMI	262.9	1.10	11	76	8.82	27.7	1.32-3.53

Global scale policies for Marine plastic



➤ United Nations Environment Assembly 1, 2, 3

- UNEA1/6, UNEA2/11, UNEA3/20: Resolution on Marine litter and microplastics



➤ Sustainable Development Goals (SDGs)

- SDG 14: Conserve and sustainably use the oceans, seas and marine resources for sustainable development



➤ International convention

- International Convention for the Prevention of Pollution from Ships, 1973 73/78
- United Nations Convention on the Law of the Sea (UNCLOS)
- Small island developing States accelerate action, 58 & 71



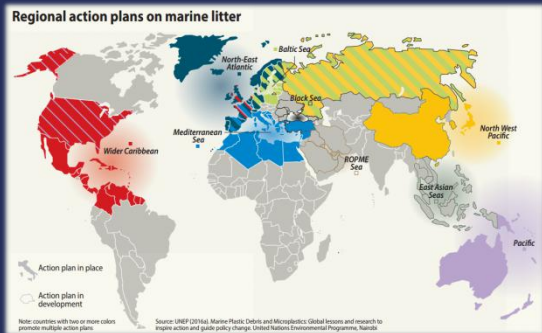
➤ Other bilateral and multilateral trades

- 2001, Honolulu strategy
- 2012, the global Marine garbage partnership (GPML)
- 2015, the group of seven (G7) : Canada, France, Germany, Italy, Japan, Britain, the United States and the European Union

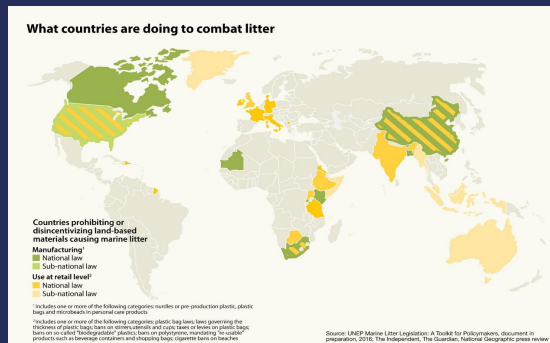


Regional scale policies for Marine plastic

➤ Number of Regional Marine Organization



➤ National scale



USA
- US Marine Debris Program(MDP), US National Marine Debris Monitoring Program (NMDMP), etc.

Canada
- Propose to ban the manufacture and sale of personal care products containing microplastics

China
1. Banned the import of foreign waste
2. Garbage classification
3. Salvage, cleaning and recovery

Japan
Control characteristics
1. the legislation of the strict supervision system
2. Responsibility clear ocean garbage recycling system
3. Comprehensive surveillance system of ocean litter

Australia
- Marine Waste reduction Draft



Marine litter as a global issue

Integrated Coastal Management (ICM) experience in Xiamen

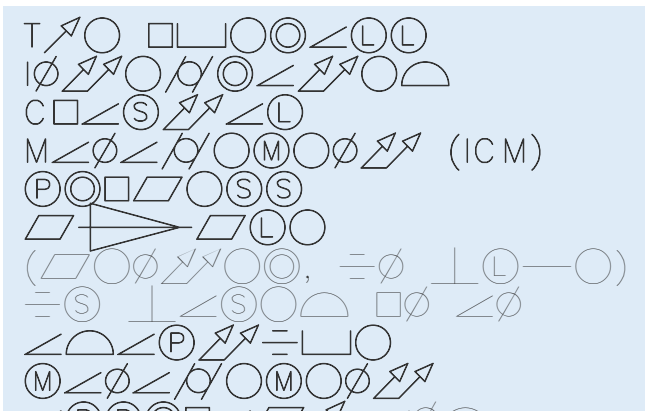
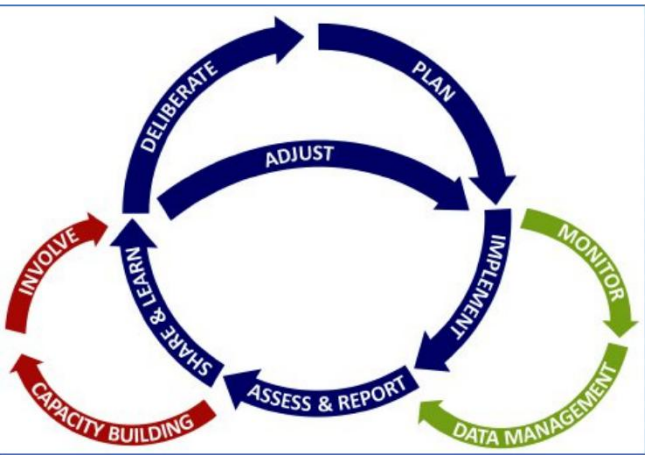
Xiamen's practice on marine litter management

Integrated Coastal Management (ICM)

- **Integrated coastal zone management (ICZM) or Integrated coastal management (ICM)** is a coastal management process for the management of the coast using **an integrated approach**, regarding all aspects of the coastal zone, including geographical and political boundaries, in an attempt **to achieve sustainability**.
- This concept was born in 1992 during the Earth Summit.
- ICZM: ***a dynamic, multidisciplinary and iterative process to promote sustainable management of coastal zones (European Commission)***



ICM management cycle



- It covers the **full cycle** of information collection, planning (in its broadest sense), decision making, management and monitoring of implementation.
- ICZM uses the informed participation and cooperation of all stakeholders to assess the **societal goals** in a given coastal area, and to take actions towards meeting these objectives.
- ICZM seeks, over the long-term, to **balance** environmental, economic, social, cultural and recreational **objectives, all within the limits** set by natural dynamics.
- '**Integrated**' in ICZM refers to the integration of objectives and also to the integration of the many instruments needed to meet these objectives. It means integration of all relevant policy areas, sectors, and levels of administration. It means integration of the terrestrial and marine components of the target territory, in both time and space."

Types and levels of integration in ICM practices

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- Integrated Coastal Management, ICM: a comprehensive governance system for coastal sustainable development
- An effective instrument/approach recognized worldwide
 - 1992, Agenda 21
 - 1992, United Nations Framework Convention on Climate Change, UNFCCC
 - 2002, World Summit on Sustainable Plan of Implementation
 - 2009, Manado Ocean Declaration
 - 2016, UN 2030 Agenda
 - CBD
 - Global Plan of Action to protect the Marine environment from land-based activities



THE
OCEAN
CONFERENCE
UNITED NATIONS, NEW YORK, 5-9 JUNE 2017



PEMSEA

Partnership of Environmental Management of Seas of East Asia

25 YEARS EXPERIENCE IN IMPLEMENTING
OCEAN AND COASTAL GOVERNANCE

INTEGRATED MANAGEMENT SOLUTIONS



11
COUNTRY
PARTNERS

21
NON-COUNTRY
PARTNERS

SDS-SEA

SUSTAINABLE DEVELOPMENT STRATEGY FOR THE SEAS OF EAST ASIA



SEA
Knowledge
Bank



STATE OF THE COASTS REPORTS



11
NATIONAL LEVEL



30
LOCAL LEVEL

PARTNERSHIPS

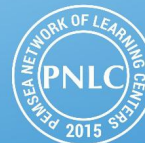
PARTNERSHIP
COUNCIL



PEMSEA NETWORK OF
LOCAL GOVERNMENTS



50 LGU
PARTNERS

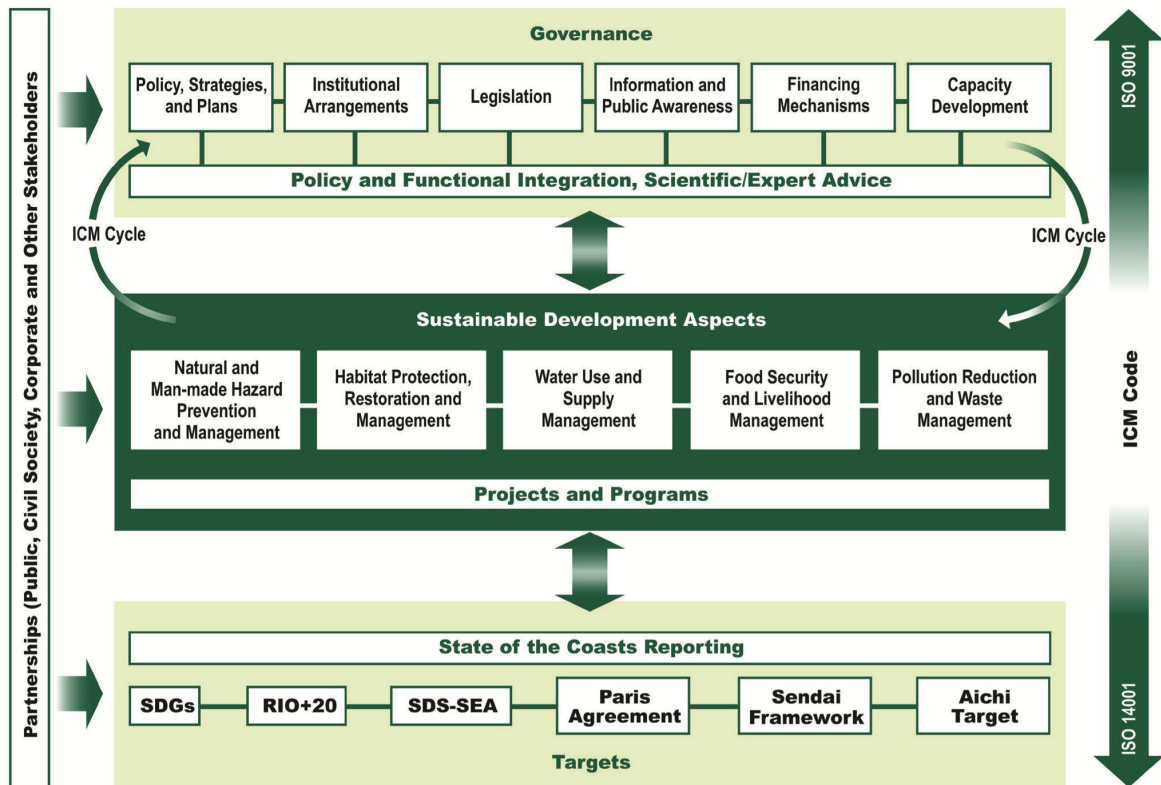


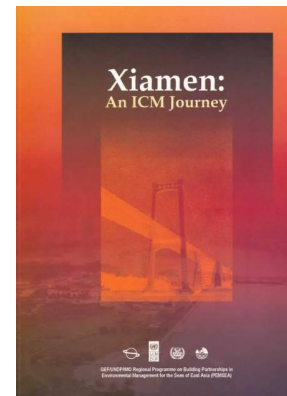
PEMSEA NETWORK OF
LEARNING CENTERS



18 UNIVERSITY
PARTNERS

PEMSEA ICM Working Model





Xiamen: An ICM Journey (2e), PEMSEA, 2006

- 2006, PEMSEA Gold Award for Outstanding Performance in Coastal Governance
- 2009, PEMSEA Recognition of Local Government Excellence in Sustainable Development of Coastal Areas Through Integrated Coastal Management
- 2019, PEMSEA Leadership Award



- Gate at the southeast of Fujian Province, China
- Looking across the Taiwan Strait
- Mouth of the Jiulong River
- One of the four Special Economic Zones in China, 17.4% growth per year since 1980s
- A harbor city and tourism destination
- Land Area: 1699 km²
- Sea Area: 390 km²
- Coastline: 234 km
- Population: 4.29 million (2019)



lancelet



Chinese White Dolphin

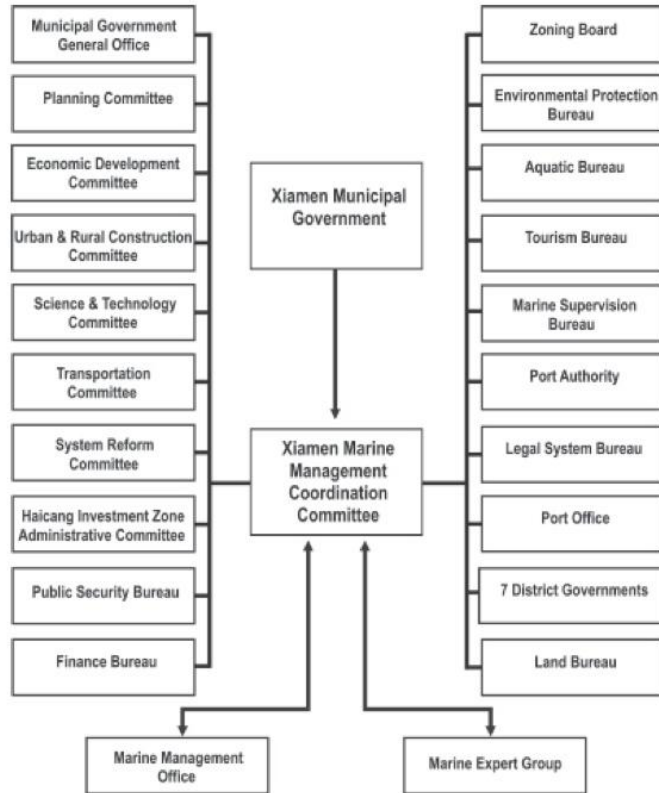


Horseshoe Crab

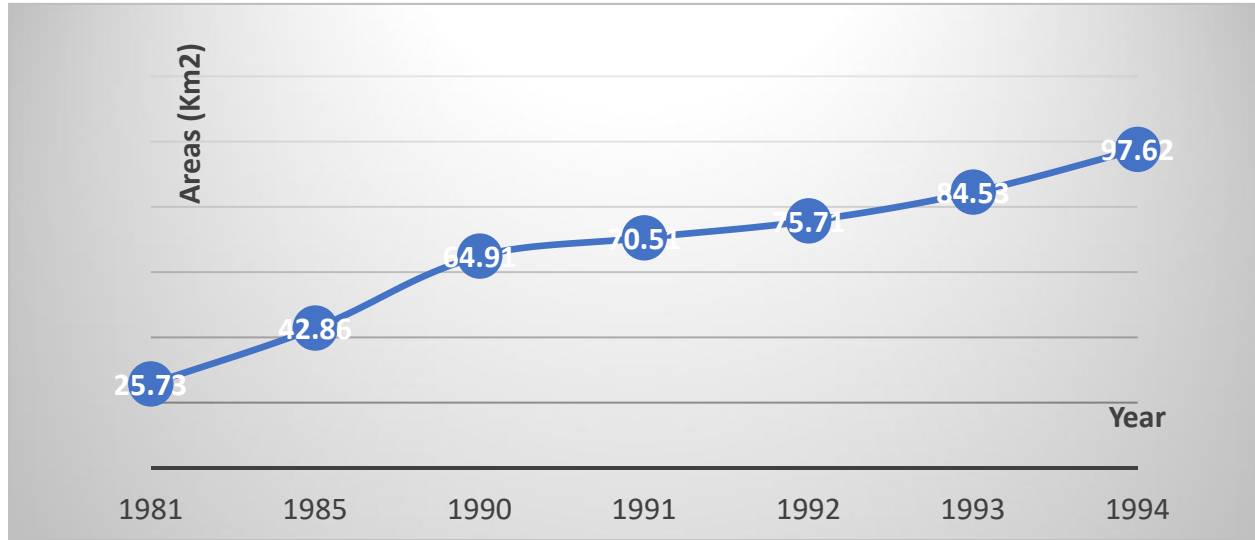


egret

Back to Xiamen in early 1990s

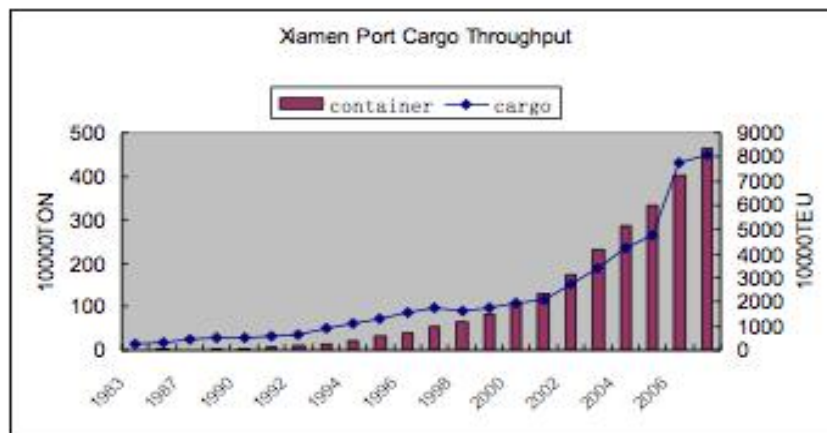


- Up to 15 Ocean-related sectors/departments/users in Xiamen Seas
- Sectoral plans based on their own interests and authorized responsibilities
- Without coordination
- Overlap/competing demands on marine resources/ocean spaces
 - Conflicting sea uses
 - Inefficient sea use
 - Over exploitation of marine resources
 - Environmental pollution
 - Ecosystem degradation

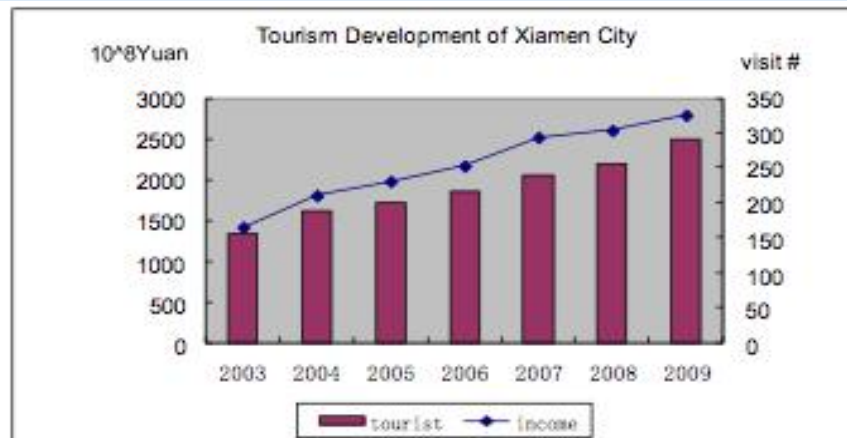


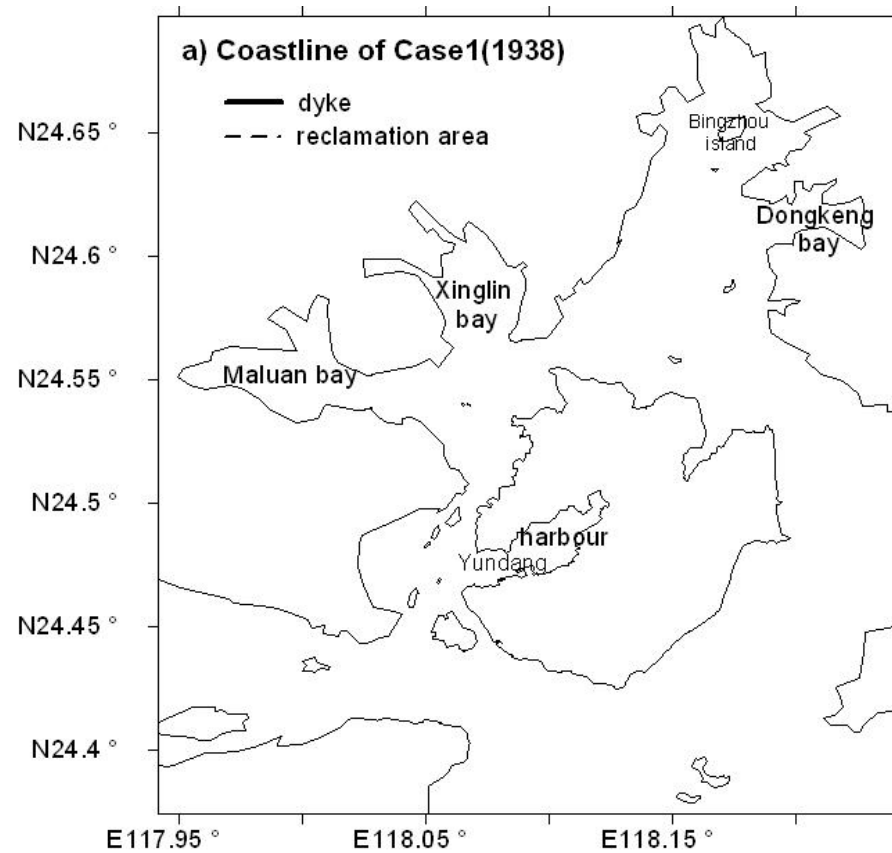
Marine aquaculture in west sea in 1990s





- Ports and shipping as a major industry in Xiamen
- Tourism development

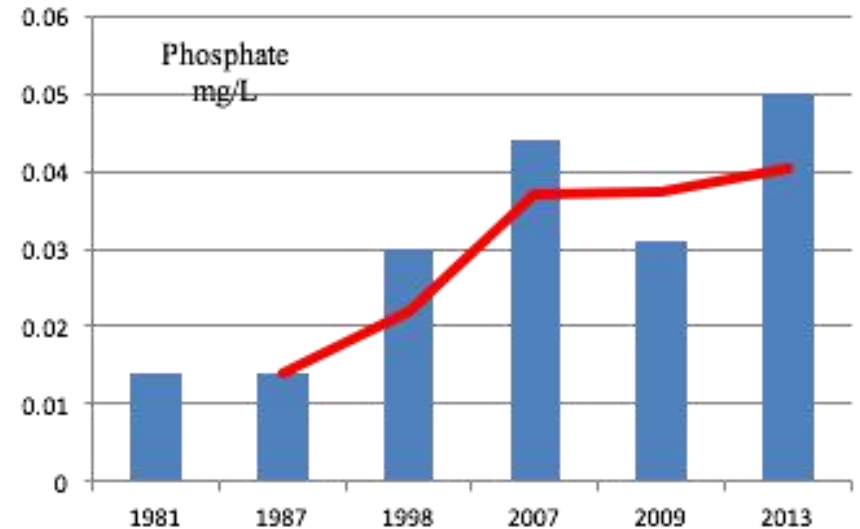
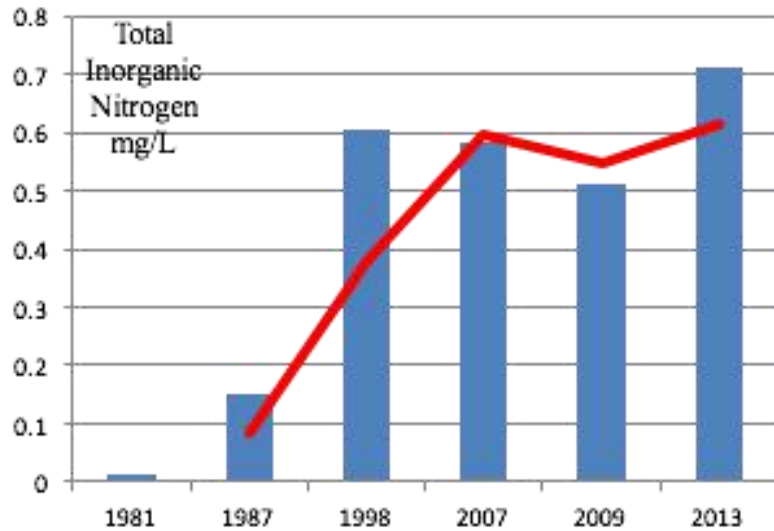




Large-scale coastal land reclamation and sea-enclose since 1950s



- Conflicts of use-use and use-environment
 - Exclusive demands on sea areas, e.g., aquaculture vs transportation
 - Conflicts of functions, e.g., aquaculture vs coastal scenery, aquaculture vs pollutant discharge
 - Externality of sea uses (transboundary effects)
 - Existing uses vs future uses

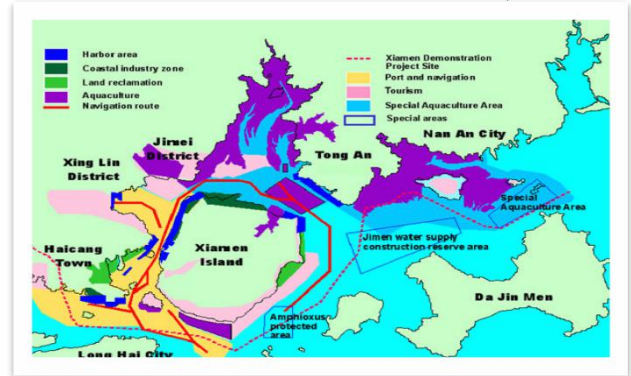


Cumulative environmental impacts as a result

Continuous implementation ICM in Xiamen, its experience has been recognized as **Xiamen ICM Model/Experience**

From general concept to concrete practice
based on the real situation

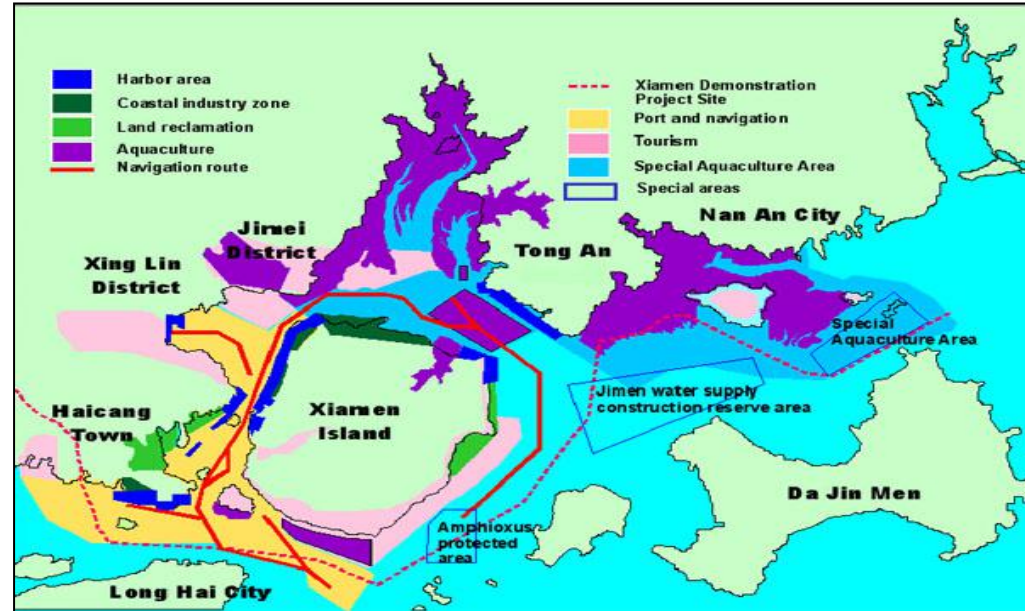
- ❖ **Legislation & Planning**
- ❖ Coordinating Mechanism
- ❖ Integrated Law Enforcement
- ❖ Scientific & Technologic Support
- ❖ Public Participation



Marine Functional Zoning is one of the key lessons learned to address conflicts of 1) use-use and 2) use-environment.

- Marine Functional Zoning was called for aiming at
 - Ensuring sea uses in order
 - Improving sea use efficiency
 - Ensuring sustainable marine resource exploitation
 - Protecting marine environment

Xiamen Marine Function Zoning Scheme (1997)



- Area-based multiple-function area: dominant function, compatible function, control and conservation function, limited function
- Western Sea / Tong An Bay / Eastern Sea / Da Deng Sea Area

- Marine functional zoning

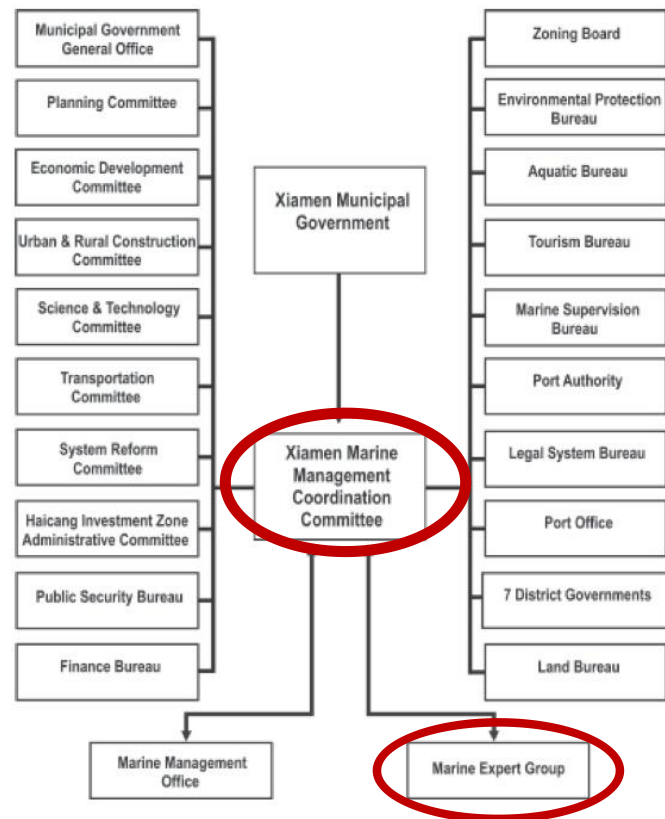


- **Divide the sea areas and islands into different function zones with different use types and environment quality requirements, based on the sea conditions, physical environment, development status, at the same time considering the needs of sustainable economic and social development.**

Continuous implementation ICM in Xiamen, its experience has been recognized as **Xiamen ICM Model/Experience**

From general concept to concrete practice
based on the real situation

- ❖ Legislation & Planning
- ❖ **Coordinating Mechanism**
- ❖ Integrated Law Enforcement
- ❖ **Scientific & Technologic Support**
- ❖ Public Participation



Continuous implementation ICM in Xiamen, its experience has been recognized as **Xiamen ICM Model/Experience**

From general concept to concrete practice
based on the real situation

- ❖ Legislation & Planning
- ❖ Coordinating Mechanism
- ❖ **Integrated Law Enforcement**
- ❖ Scientific & Technologic Support
- ❖ Public Participation



Comprehensive law enforcement

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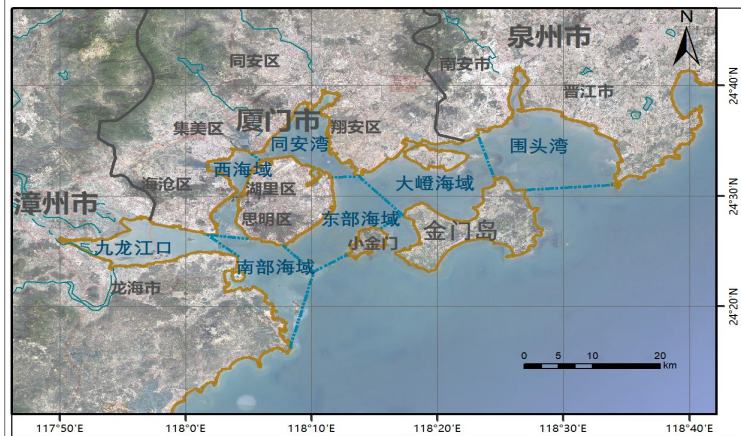


Gulangyu Islet in Xiamen, a UNESCO World Heritage Site

Marine litter in Xiamen Seas



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	2013	2014	2015	2016	2017	Average
XiaGu waters	773.9	476.8	476.8	791.2	550.8	613.9
Western Sea	110.6	106.1	105.0	62.6	-	96.1
Waters north of Gulangyu island	472.6	242.7	229.6	138.8	-	270.9
Baicheng sea area	-	-	-	204.6	274.33	239.5
Wuyuan Bay waters	386.7	252.8	223.2	265.6	306.9	287.0
Jiulong river estuary	690.6	551.7	495.8	934.1	758.7	686.2
Total	2434.4	1630.1	1530.3	2396.8	1890.7	2193.5

2013-2017 Total amount of marine litter in Xiamen sea areas

- The main types of marine litter in Xiamen seas are **aquatic plants, wood, bamboo poles, beverage bottles and plastic bags.**
- **90% plant stems** , while the rest are plastic foam and household waste (Xiamen Ocean and Fisheries Bureau)
- About **80% comes from Jiulong River**, the main sources were **Rivers entering and human activities** (China Ocean News)



Lesson 1:

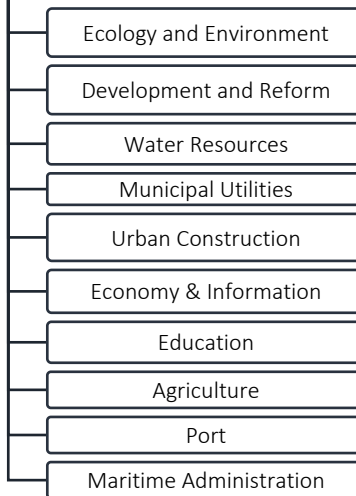
High level leading agency and coordinating mechanism of marine litter management

- Sino-US Cooperation Leading Group of Marine Litter Prevention and Treatment, Vice mayor as Group Leader
- Coordinating Group on Emergency Disposal of Marine Litter, Office in Xiamen Bureau of Ocean Development

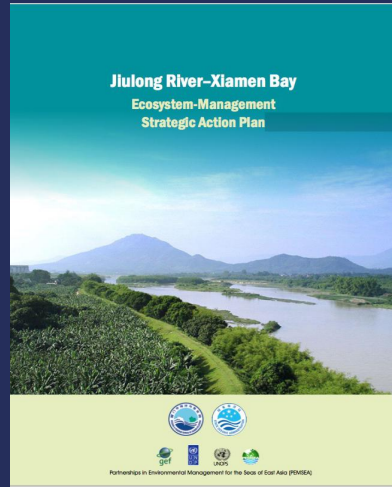


Beach litter after Typhoon

Xiamen Bureau of Ocean Development



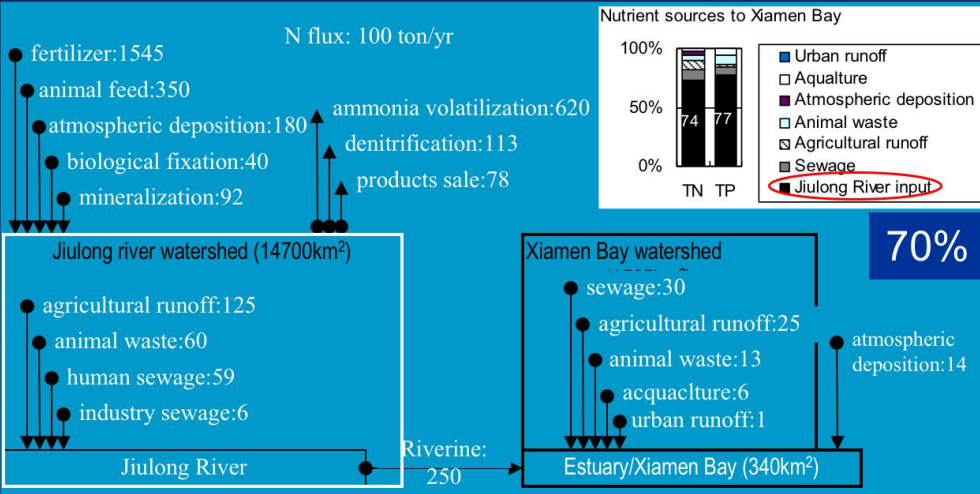
- Marine litter management is included in the **Xiamen Ecological Civilization Performance Evaluation Guide** for each district and department



• Lesson 2

Integration management of land-sea, particularly Jiulong River basin – Estuary – Xiamen Seas

- Pilot Work Plan for Jiulong River – Xiamen Bay Total Control of water pollution to seas, Xiamen Municipal Government, 2017: Three tasks and 35 measures
 - ✓ Capture trash and debris in the upstream rivers to reduce the marine litter in Xiamen Seas
 - ✓ ‘River Chief’: where “river water sanitation, garbage collection and disposal along the upstream rivers” as a major measure
 - ✓ Cleanup work expand in Xiamen Seas



Source: Nengwang Chen



Lesson 3:

Science and technology supports the marine litter management in Xiamen Seas



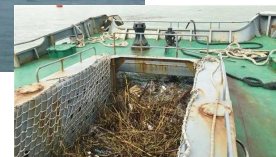
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Video monitoring of marine litter in Xiamen Seas



Modelling and forecast the locations of marine litter



Guide the boats to the right places to improve efficiency



Lesson 4:

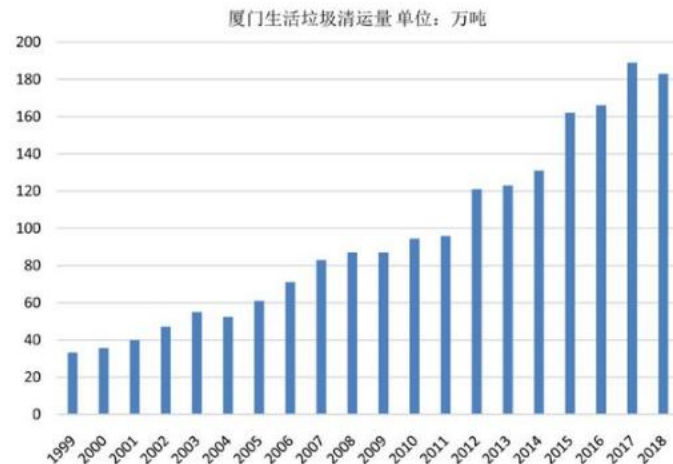
Public participation is vital for the marine litter management in Xiamen Seas



Beach cleanup activities

- Xiamen was the first pilot city of garbage classification in China since 2016
- The best city in Ministry of Housing and Construction's evaluation

- Cover 100% built-up area and 90% rural area
- 85% citizen participate
- 80% accuracy rate of garbage classification



The way forward

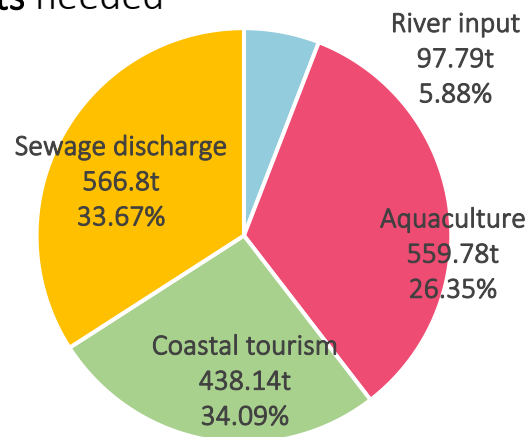
- **More effective cooperation with Jiulong Watershed upstream areas**
 - Ecological compensation as a payment mechanism between downstream and upstream, where water quality is the focus, will litter management be included in the future?
- **Source identification needs more science input**, particularly when specified to marine plastic
- More **stakeholders participation** and more **incentive instruments** needed

Marine litter	Marine plastic	Marine microplastic	
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Public	Government	Industrial circle	Academic circle
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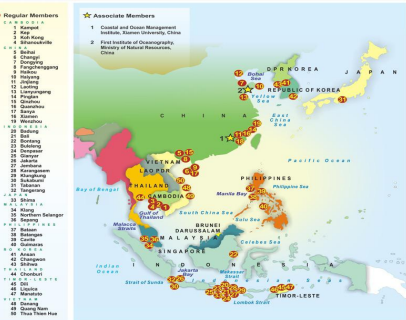
Municipal administration	Industrial policy	Scientific research	
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TSP	PM2.5		
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Sources of marine plastic in 2019

SUSTAINABLE DEVELOPMENT GOALS



服务国家一带一路战略倡议
Contribute to Belt & Road Initiative



海洋与海岸带可持续发展领域 国际认定的 区域卓越中心

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Research|Marine Affairs Program|Training|Forum



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Forge a high level think tank on marine affairs



厦门大学海洋文理工交叉多学科研究团队
An ocean-related multidisciplinary research team from Xiamen University