

Polyculture in Embayments and Ponds In Yellow Sea region, China

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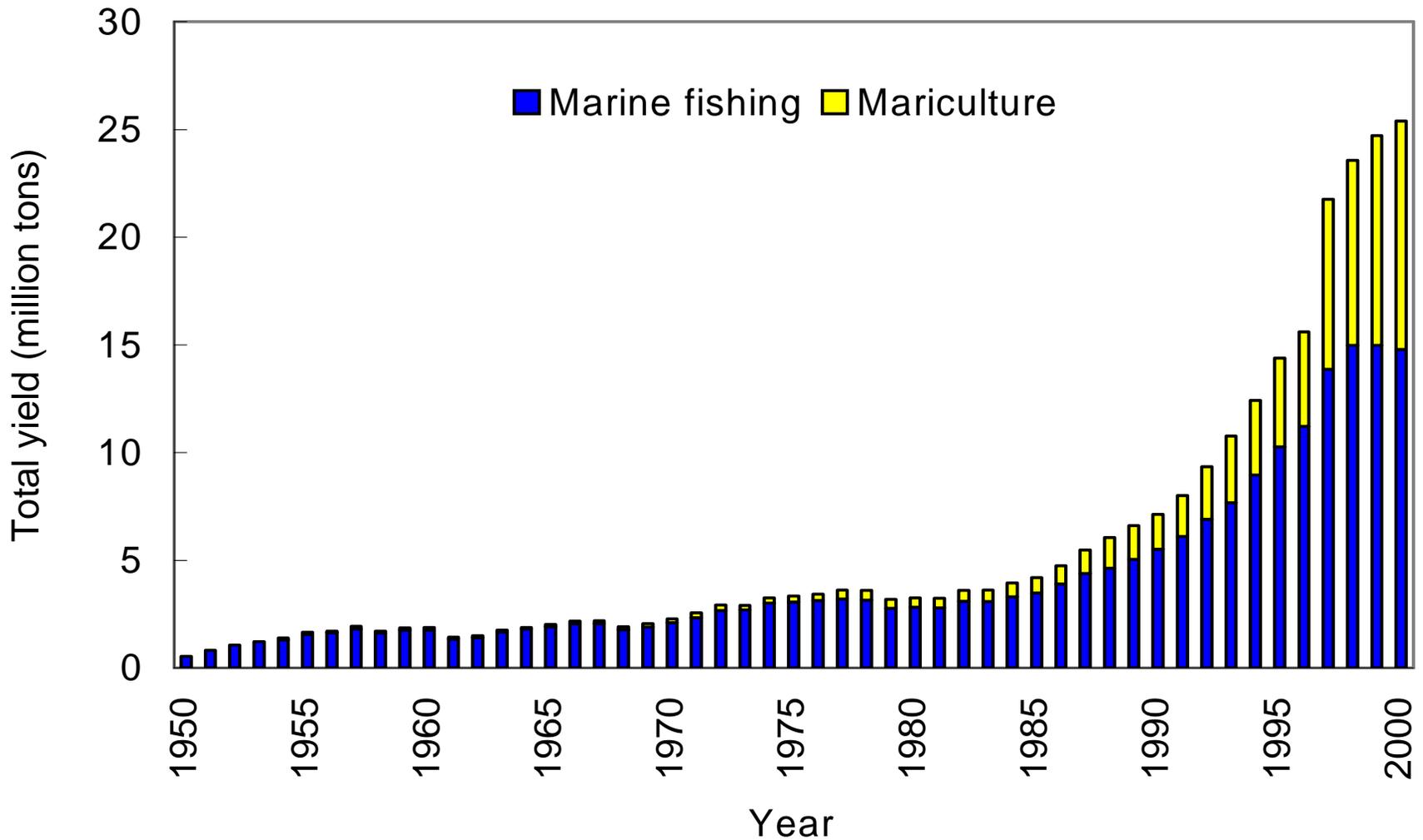
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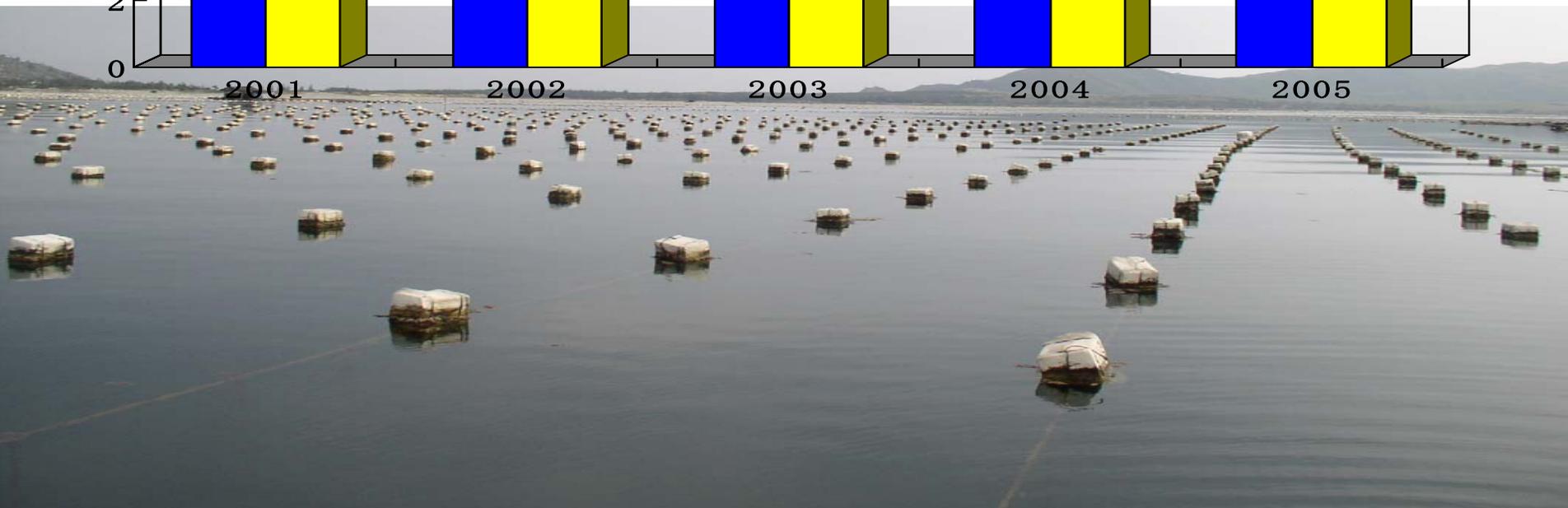
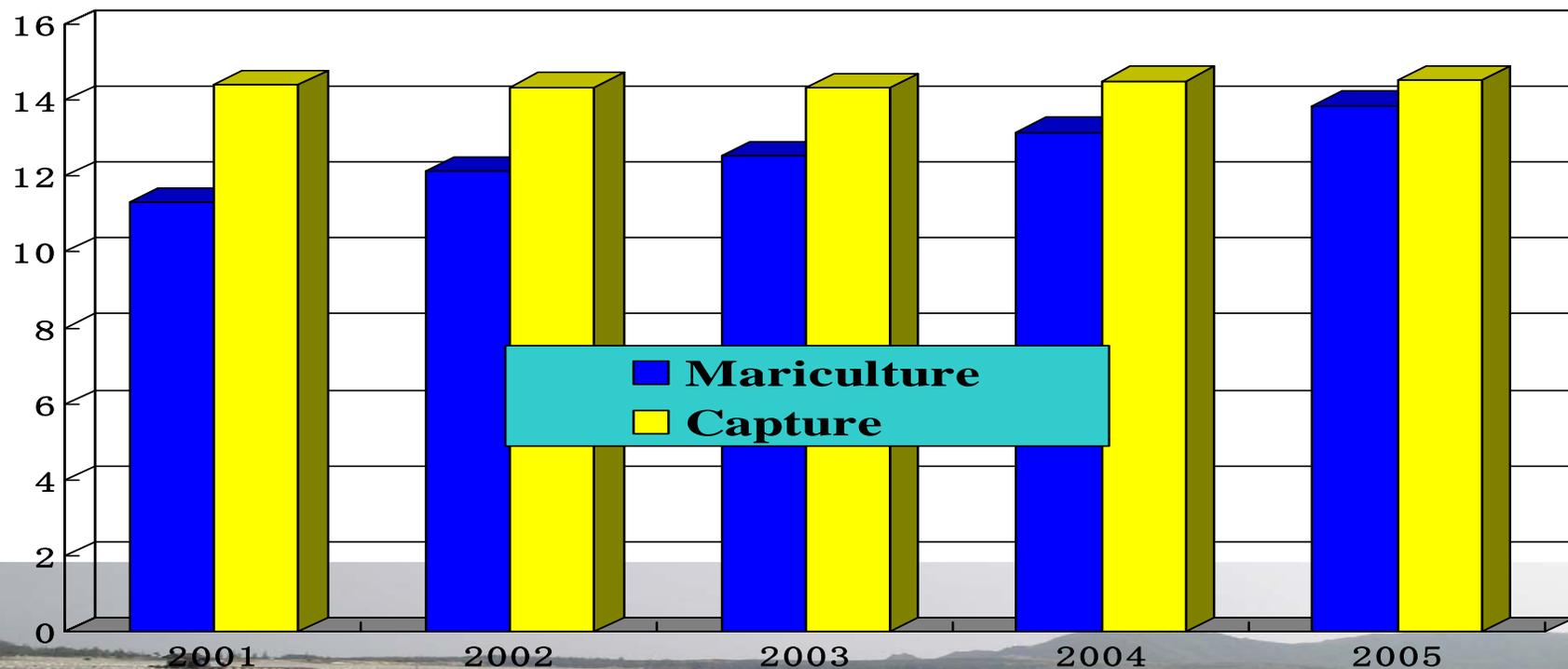
General Introduction of mariculture status in China





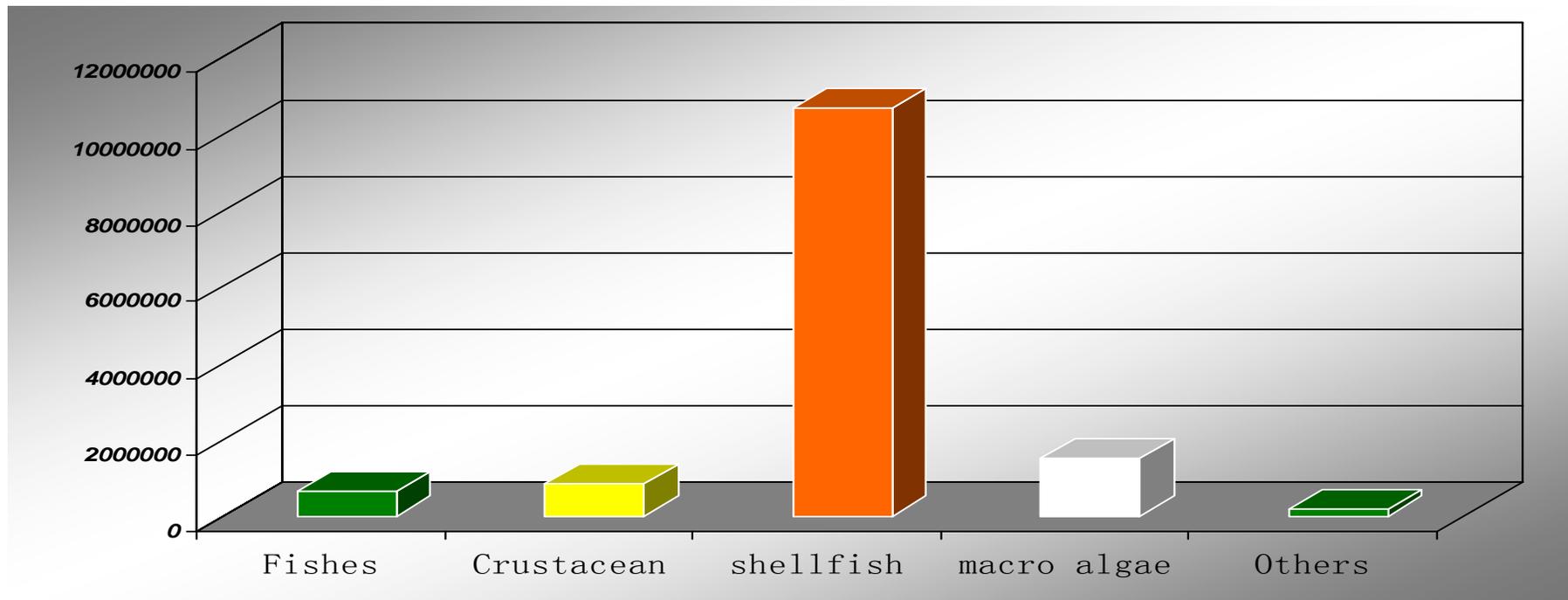
Mariculture status in China

Mariculture status in China in recent years (Million MT)



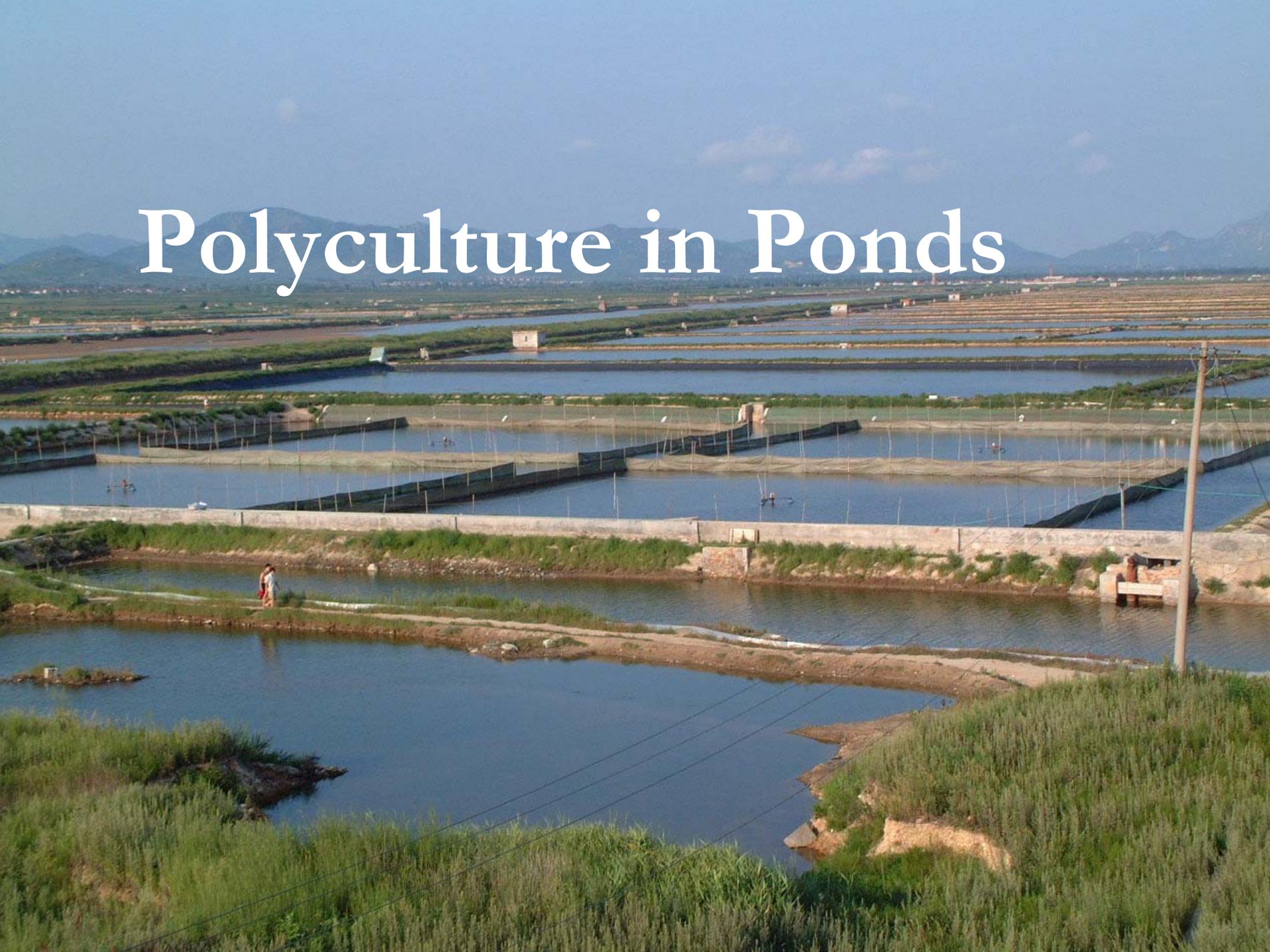
Mariculture status of China

Mariculture Yields of China in 2005 (MT)



Groups	Total	Bivalves	Macroalgae	Fishes	Crustacean	Others
Yield (M MT)	13.848	10.675	1.511	0.659	0.828	0.173
%	100%	77.09	10.91	4.76	5.98	1.25

Polyculture in Ponds



Polyculture in Ponds

- Shrimps + Shellfish (Manila clam, Razor clam)
- Shrimps + Fish (mullet, sea bass, globe fish...)
- Shrimps + Crab
- Shrimps + Sea cucumber

Shrimps is the dominant species of polyculture in ponds. Above polyculture activities were well practiced since the occurrence of diseases of shrimp from 1993 in China.

Polyculture in Natural Seabed in Northern Yellow Sea



Zhangzi Islands

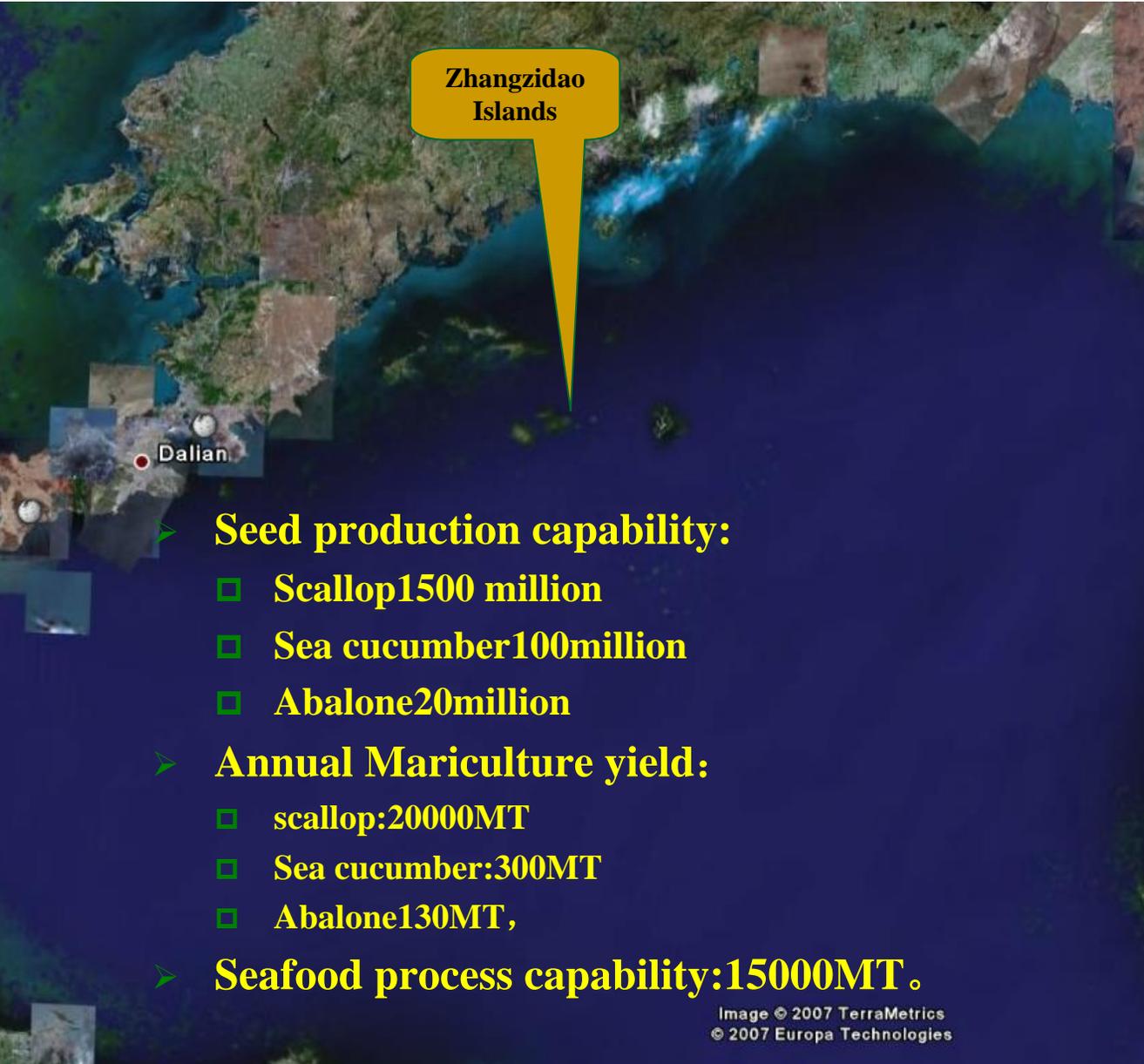
Sungo Bay

Image © 2007 TerraMetrics
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Streaming ||||| 100%

The most famous fishery enterprise---Zhang Zidao Fishery Ltd



Zhangzidao Islands

- **Seed production capability:**
 - ❑ Scallop 1500 million
 - ❑ Sea cucumber 100 million
 - ❑ Abalone 20 million
- **Annual Mariculture yield:**
 - ❑ scallop: 20000 MT
 - ❑ Sea cucumber: 300 MT
 - ❑ Abalone 130 MT,
- **Seafood process capability: 15000 MT.**



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Main Culture species



Japanese Scallop



Abalone



Sea squirt



Sea cucumber



Sea urchin



Ark shell

The most effective polyculture models practiced in natural seabed in Zhang Zi Island



Food: Macro Algae



Food: Phytoplankton



Detritus, faeces
benthic diatom



Detritus, faeces
benthic diatom

Natural sea bed is becoming the treasure pool of aquaculture farmers by carrying out the Enhancement of sea cucumber, abalone, scallop, sea urchin in northern China along the coastal line of Yellow Sea



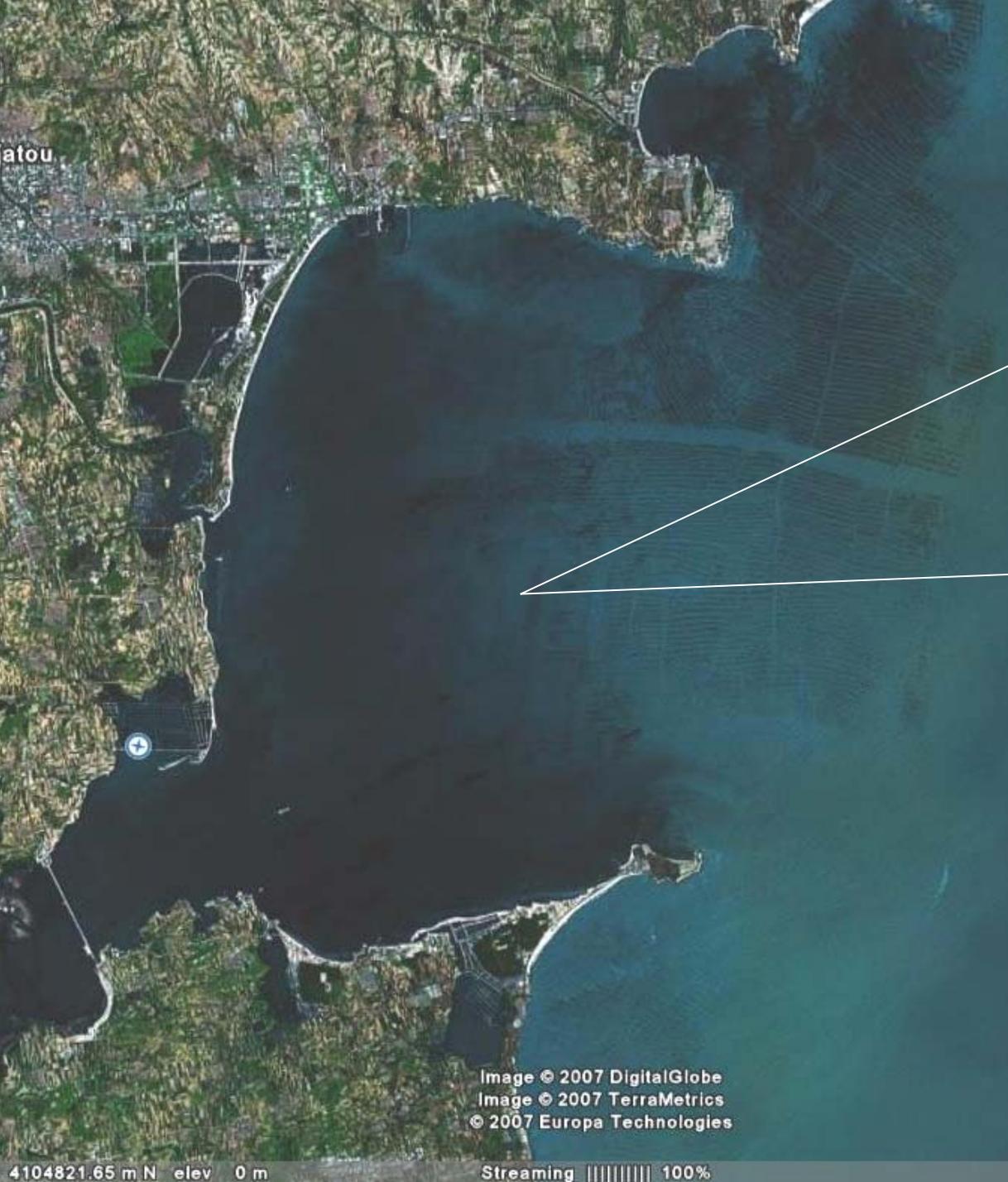
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Enhancement technology



- 1. Producing the seeds in hatchery**
- 2. The carrying capacity of natural sea bed for enhancement should be assessed based on the food supply/demand, and especially the integrated ecosystem management strategy.**
- 3. When the seeds reach to size for releasing, they will be sowed onto the sea bed in the density suggested by carrying capacity assessment.**
- 4. The predators such as starfish, crab and so on will be removed by the diver or by the induced fishing net**

Polyculture in Sungo Bay, Yellow Sea



Sungo Bay

Located in the east end of Shandong Peninsula with the area of 1300 ha

Annual mariculture production:
Laminaria: 80,000 Tones (dw),
Oyster: 100,000MT with shell
Scallop: 3000MT with shell
Abalone: 12million ind.

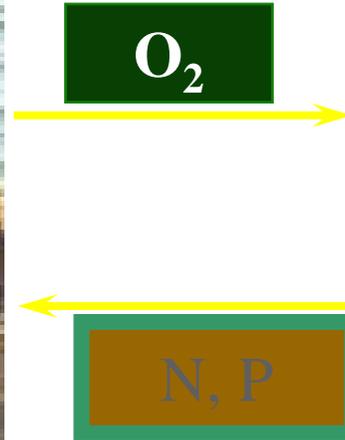
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Streaming ||||| 100%

Polyculture

1. Integrated culture of shellfish, fish and seaweeds



When kelp cultivated inside the fish cages culture area, the seaweed can directly absorb the nutrients produced by the fish. This model not only can yield extra income by kelp, but can prevent the culture regions from eutrophication.

Polyculture

1. Integrated culture of fish and seaweeds



Polyculture

2. Polyculture of shellfish (oyster, scallops, mussels) and kelp -based on carrying capacity of culture site



Polyculture

3. Integrated culture of abalone (Sea urchin) and Kelp *Laminaria japonica*)



Polyculture

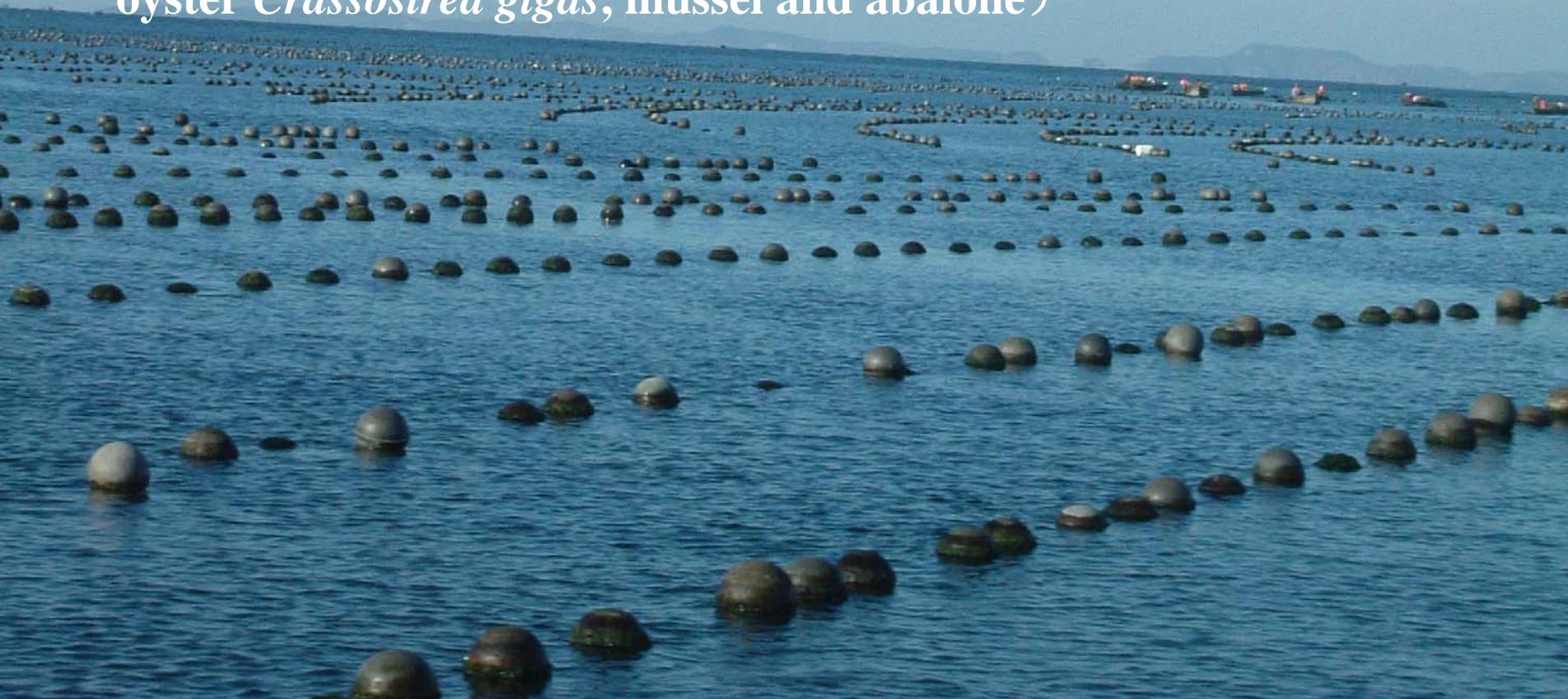


Suspending culture in shallow water

Main culture species:

macro algae: kelp, larea, *Undaria* spp,

Shellfish: Bay scallop *Argopecten irradians*, Japanese scallop *Patinopecten yessoensis*, Native scallop *Chlamys farreri*, Pacific oyster *Crassostrea gigas*, mussel and abalone)



Polyculture is playing an important role for mariculture in China



Integrated culture of kelp and abalone can gain higher economic benefit than ever before



Polyculture of scallop and kelp has raised the survival rate of scallop from 40% to 90%

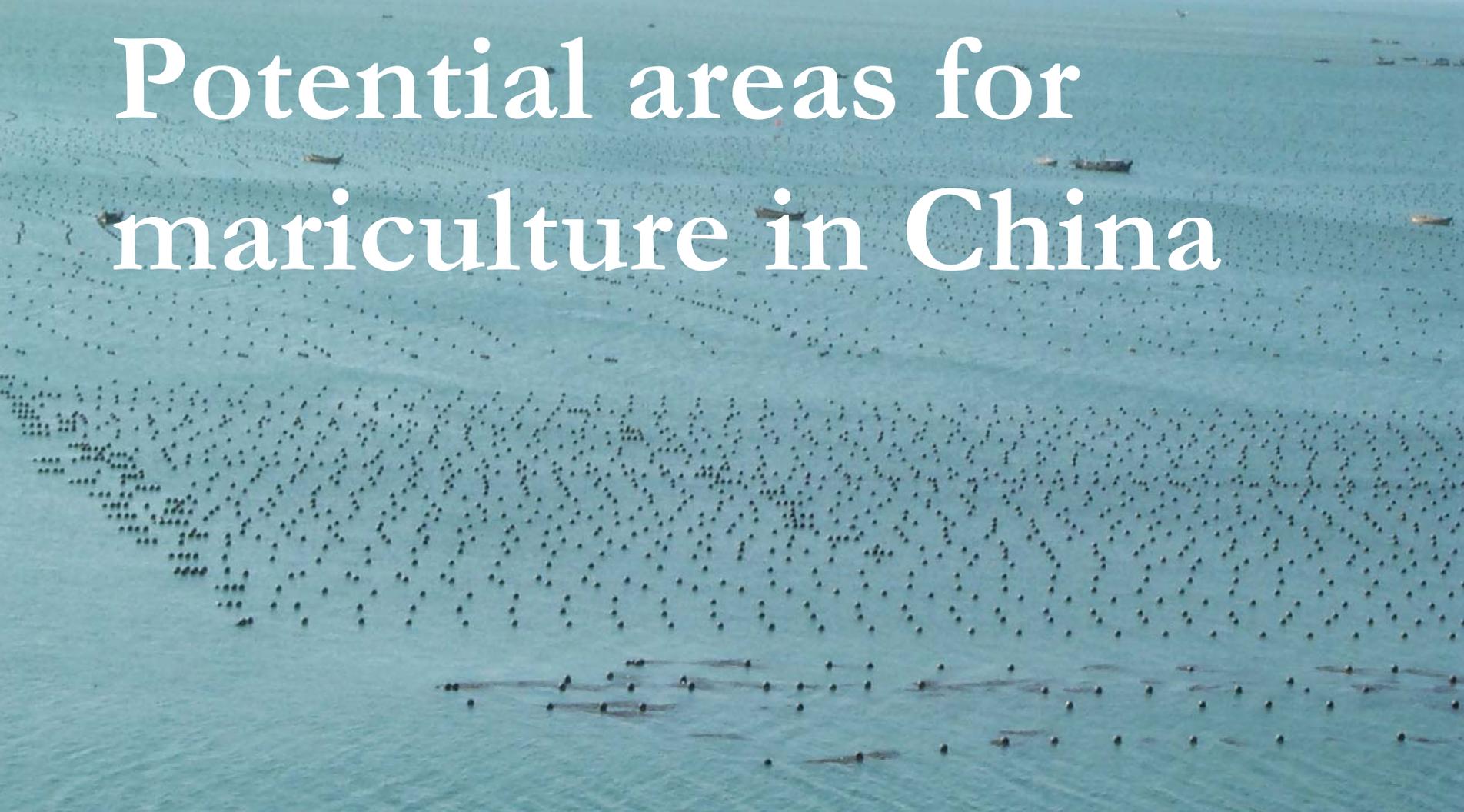


Based on the data of annual mariculture production of China, more than 3 millions tons carbon being utilized and about 1.2 millions tons carbon was removed from the shallow sea by harvesting of maricultured seaweeds and shellfish each year.

Mariculture of China has made a great contribution to the world for reducing the effect of global green-house produced by CO₂.



Potential areas for mariculture in China

An aerial photograph of a large-scale mariculture (sea farming) operation in China. The image shows a vast expanse of blue water filled with thousands of small, dark, rectangular floating cages or structures, arranged in a grid-like pattern. The water is a deep blue, and the sky is a lighter blue. The overall scene depicts a massive, organized aquaculture system.

- ❑ **In China, Most of the mariculture activities is limited within the shallow sea where the water depth is less than 20 m, while the off shore areas of 34 million ha between 20-40 m in deep has not exploited so far.**
- ❑ **~~If 20% of the areas is exploited, the new annual mariculture production may reach to 70 million tones, about 5 times higher than that of total annual mariculture production in 2005.~~**

Improved and new designed culture facility for scallop in deep water area(30-40m)



Summary

A close-up photograph of various marine life, including several scallops with their characteristic ridged shells, a dark brown sea urchin, and a purple sea slug, all resting on a green mesh net. The background is dark, making the shellfish stand out.

- Polyculture or integrated mariculture has been regarded as the one of the most effective and ecological benefit sustainable mariculture in China.
- The central and local government has paid great attention on the shellfish safety production in recent years.

THANK YOU

