

Some Consideration on the Sustainable Development of Mariculture in China

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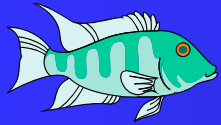
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Outline

- Status of mariculture industry in China
- Challenges & problems
- Some consideration
- S&T aspects of the sustainable development of mariculture



Fishery plays an important role in economic development in China

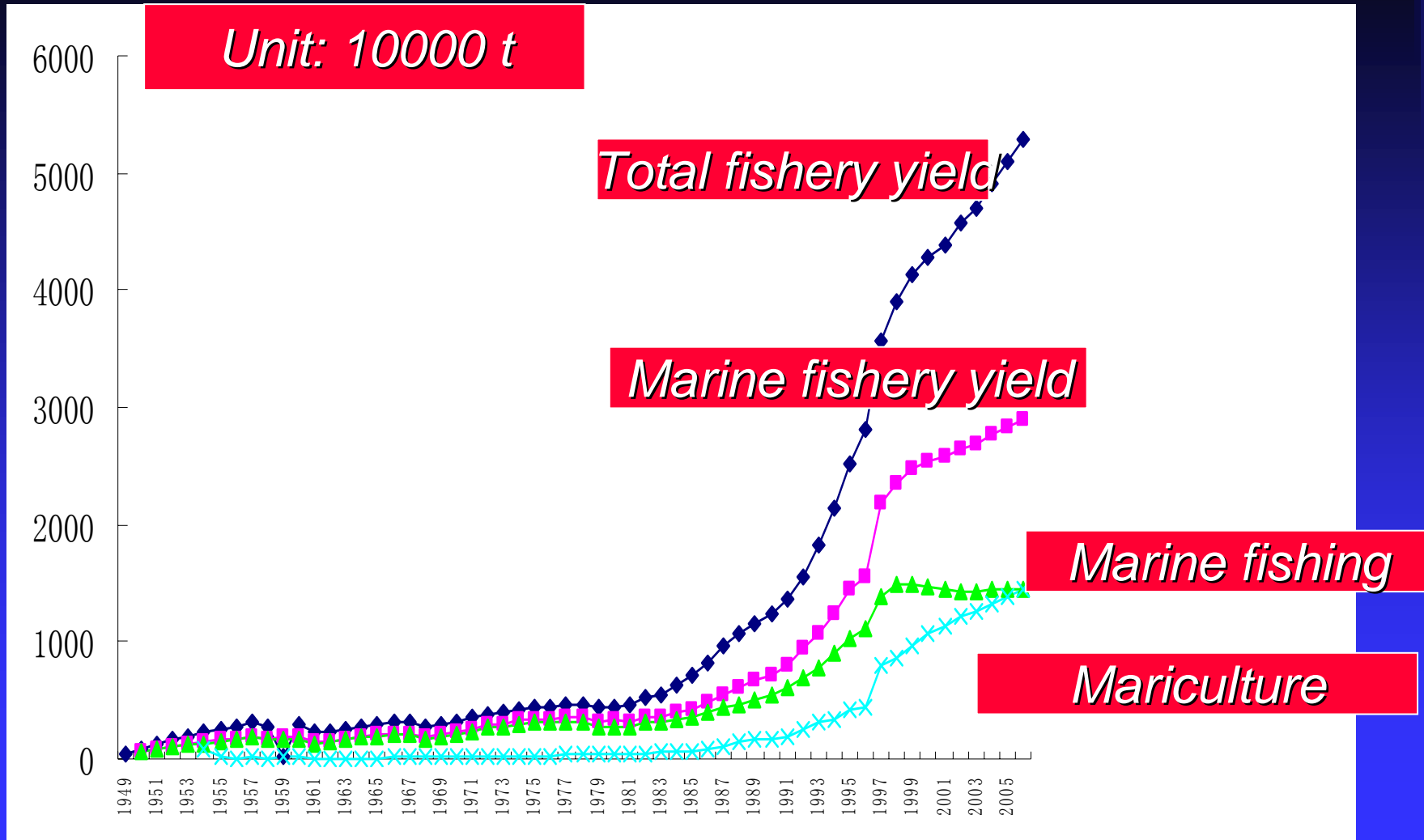
Total fishery production reached **47.475 millions tons** in 2007 which accounted for around 1/3 of world fishery yield.

Aquatic products consumption **per capita 40.46 kg**, 8 times that of 1980, 2 times of world average.

Fishery employee accounted for 2% of agriculture population, however, produced 1/3 of animal protein supply, plays an important role in food security in China.

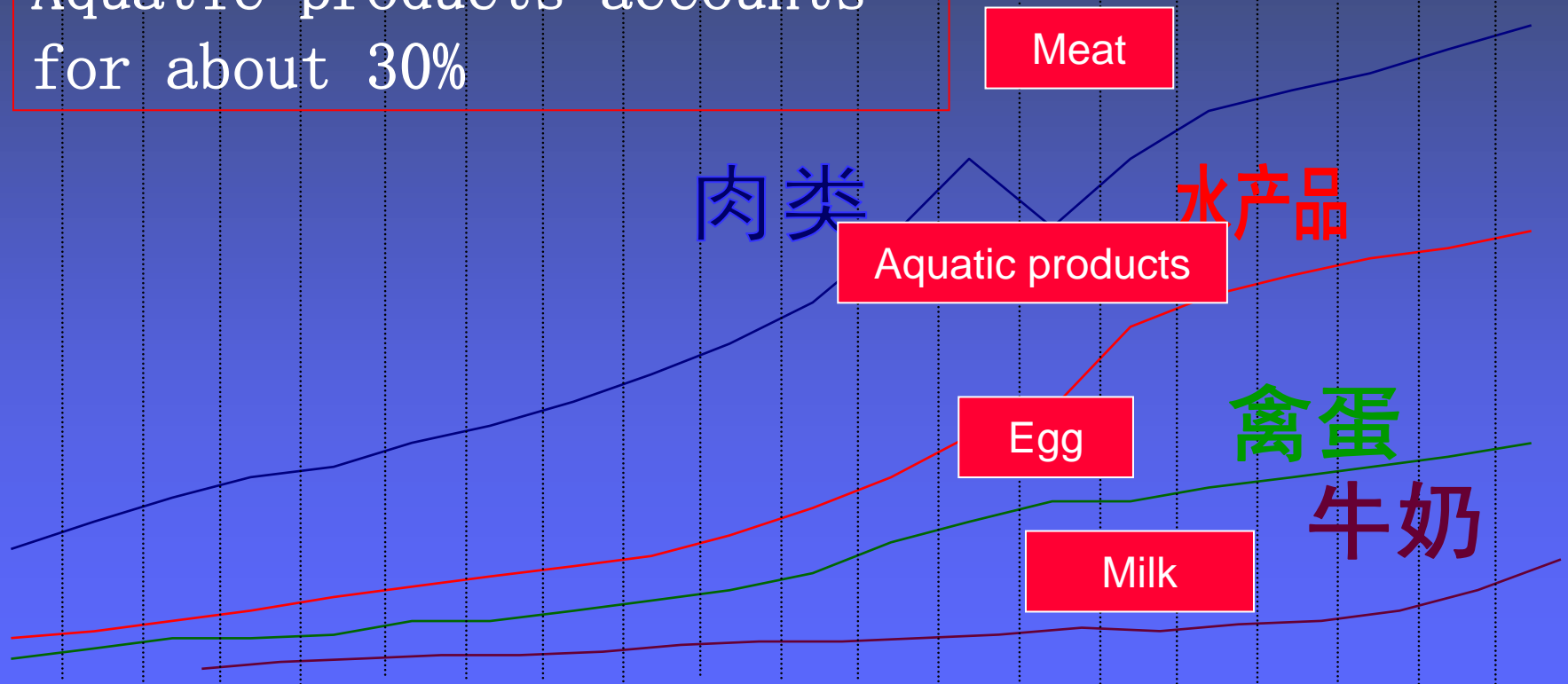
Total aquatic products in foreign trade was **6 337 000 tons** in 2006, accounted for **30.2%** of agricultural products in foreign trade of the country.

Fishery development in China 1949-2006

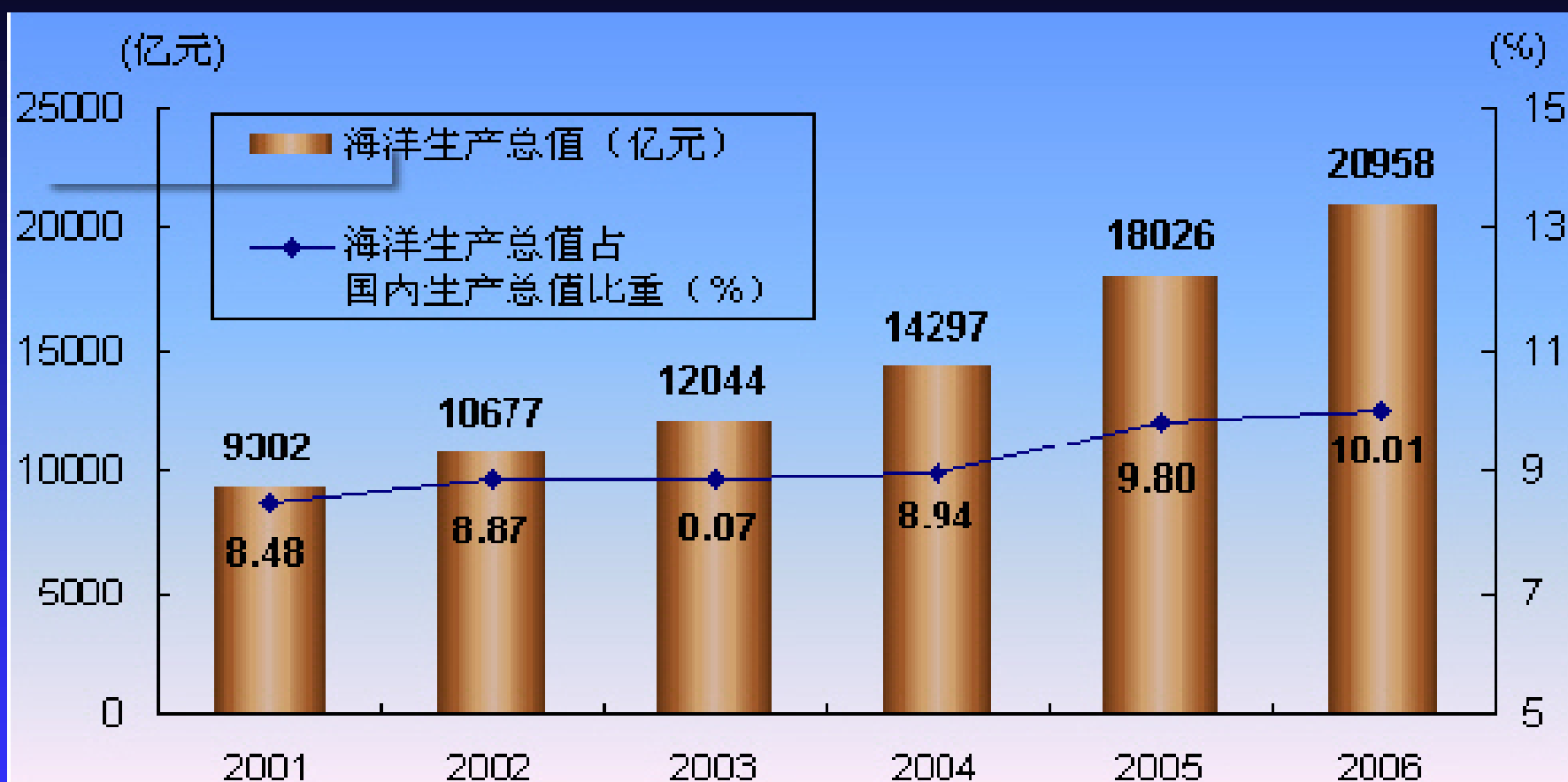


Animal protein supply in China 1988-2003

Aquatic products accounts
for about 30%

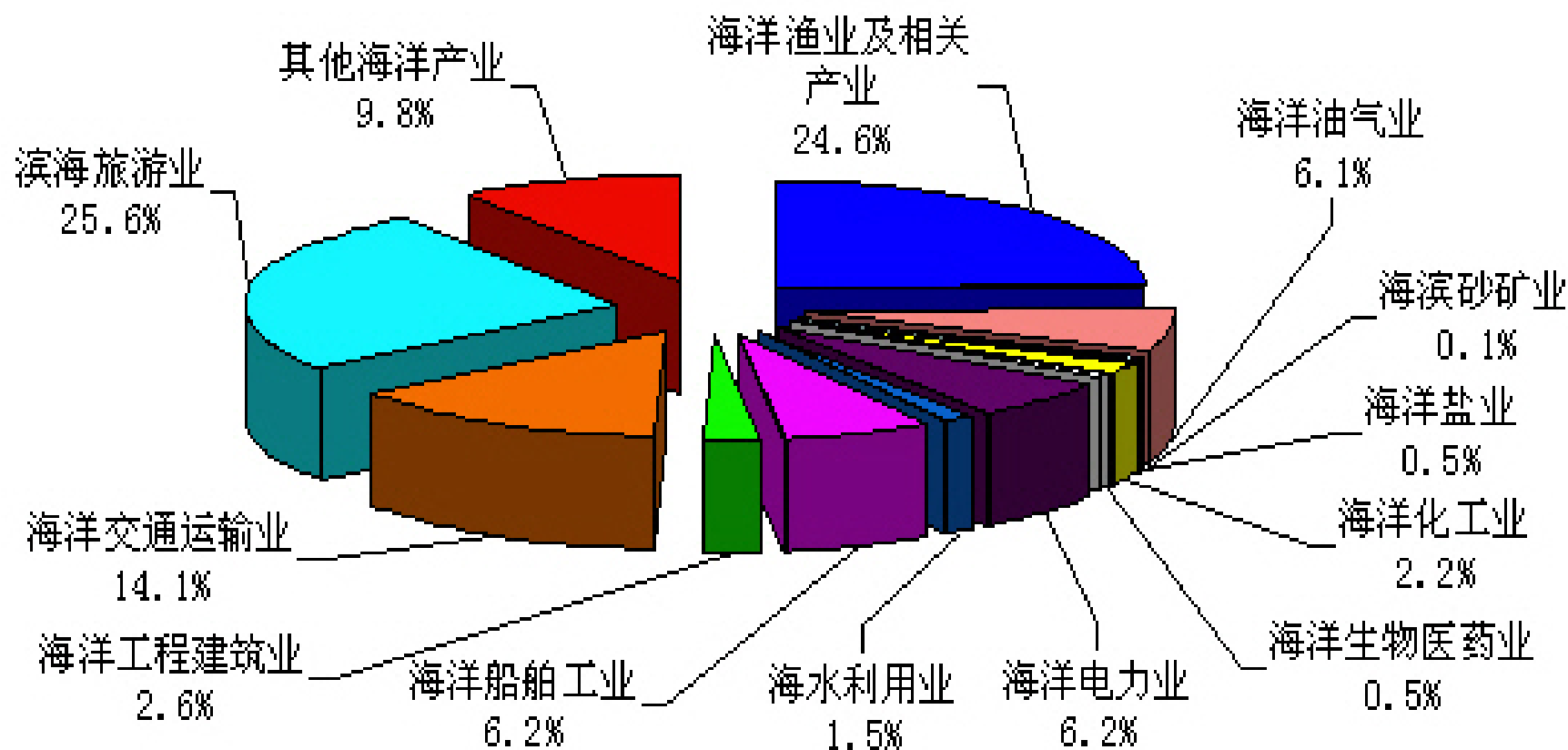


Trend of marine economy development



(2001-2006 年海洋生产总值及其占国内生产总值比重，资料来源：国家海洋局网站)

Proportion of fisheries in marine economy 2006



(2006年主要海洋产业总产值构成图, 资料来源: 国家海洋局网站)

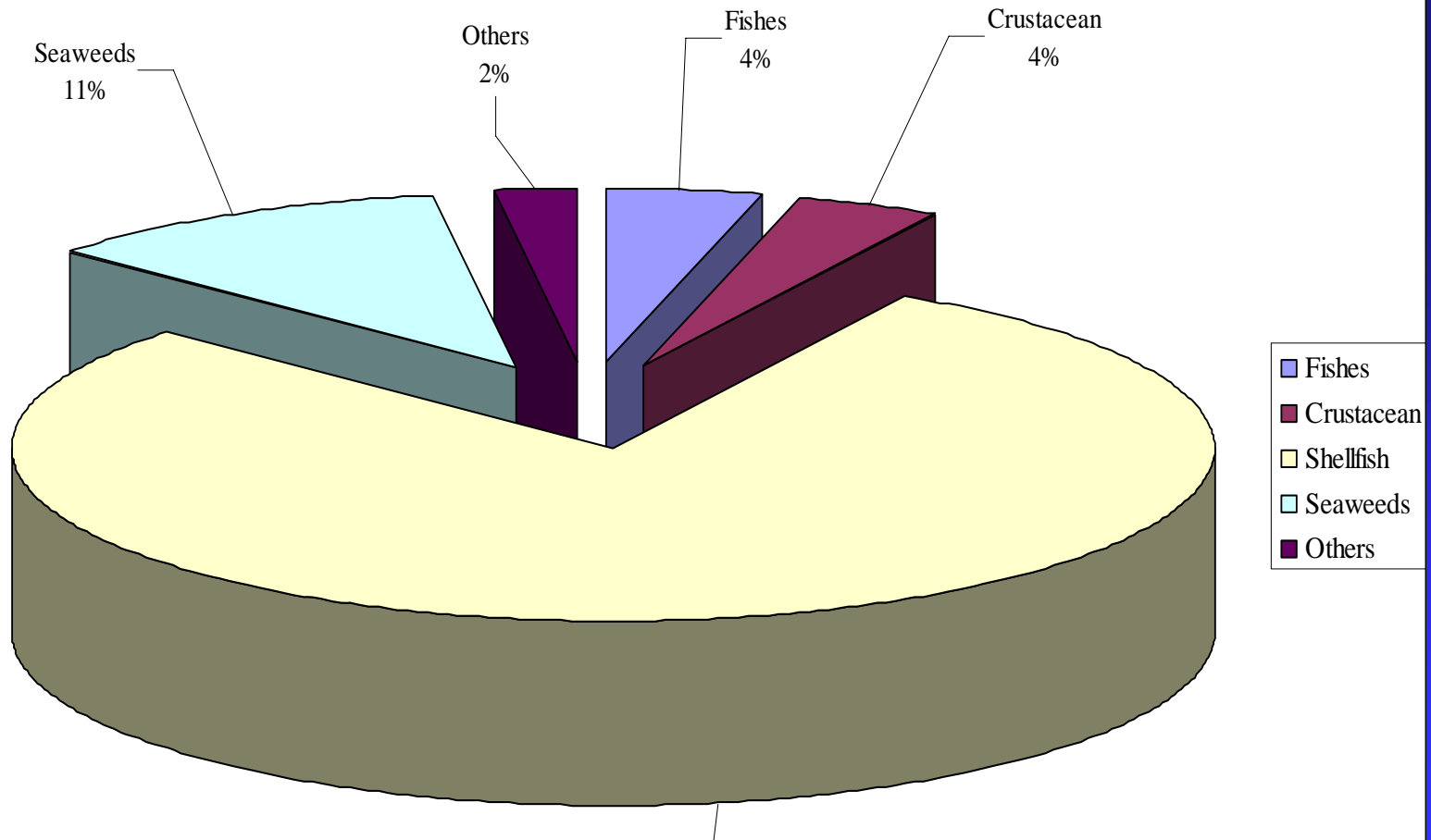
Fishery yield & value in 2006 in China

Catagory	Yield (%)	Value (%)
Marine fishing	27	21
Mariculture	27	23
Freshwater fishing	5	5
Freshwater aquaculture	41	46
seedling		5

Mariculture species by category

- Fish > 50
- Shellfish > 30
- Crustacean > 10
- Seaweeds > 5
- Others > 5
- Total > 100 species

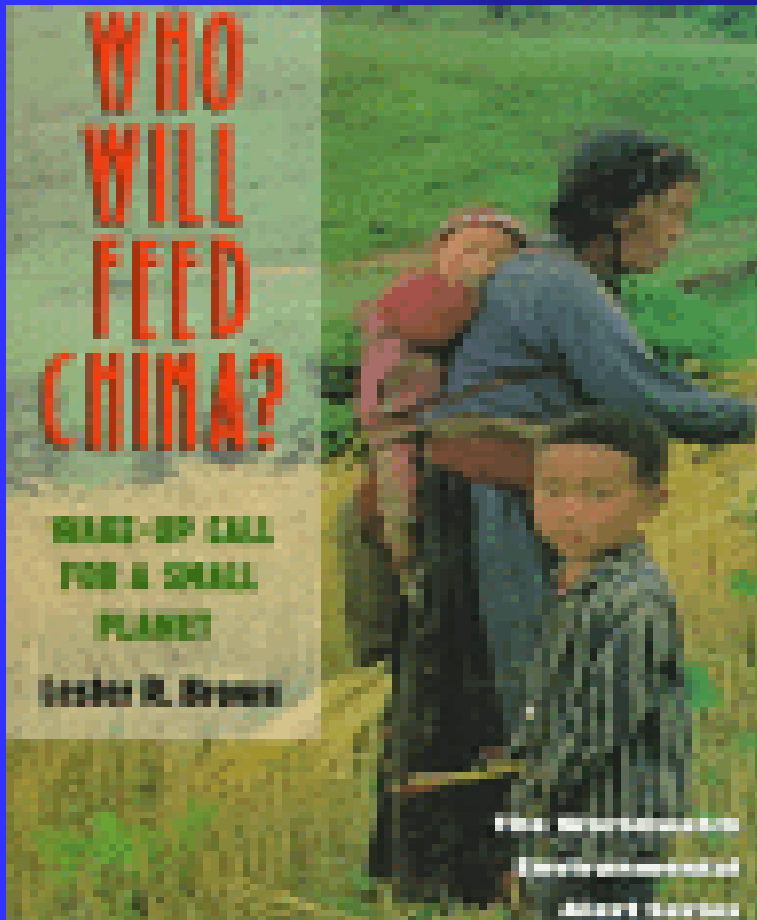
Production distribution by category



Challenges and Problems

- Diseases, environmental, globe warming,...
- Consumers pay much more attention to quality issues than ever;
- Organic food, green food, quality food are strongly aware of by public;
- Mariculture should be developed harmoniously with ecosystem;
- Sustainable development is a inevitable course to follow for mariculture.

Build a sustainable developing aquaculture industry



A healthy aquaculture industry should give overall consideration on population, market, quality, resources, environment, ecosystem etc. to ensure the sustainable supply of aquatic products based on the ecosystem carrying capacity.

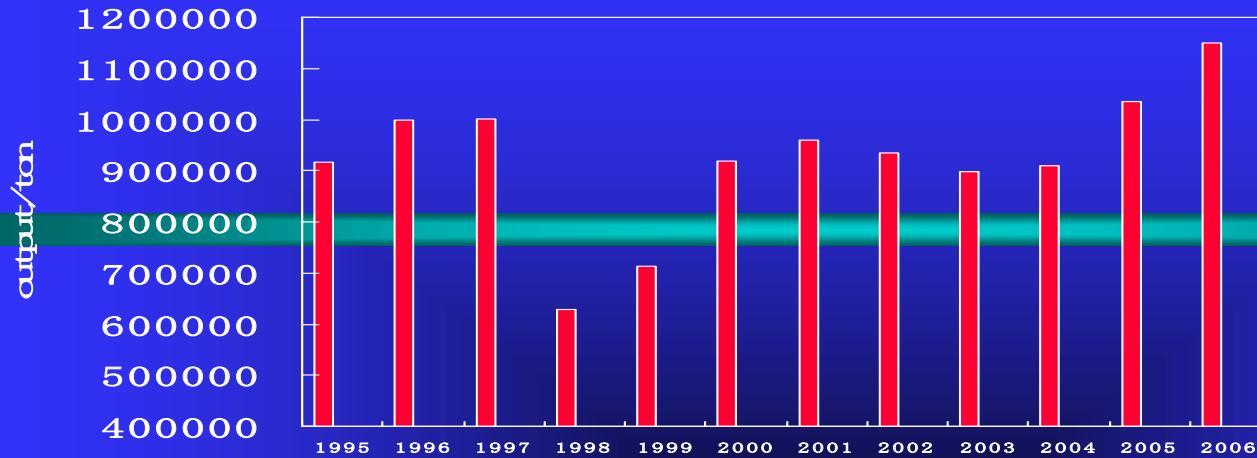
Aquaculture may promote the sustainable utilization of bio-resources

- With the socio-economic development, human being has more and higher demand for high quality protein supply.
- How to meet the needs?
 - Beef: to produce 1 pound beef needs
7 pounds grain;
 - Pork, milk, egg?
 - Fish, shellfish, crustacean, seaweeds ?
- Aquaculture development in China is an important contribution to the world

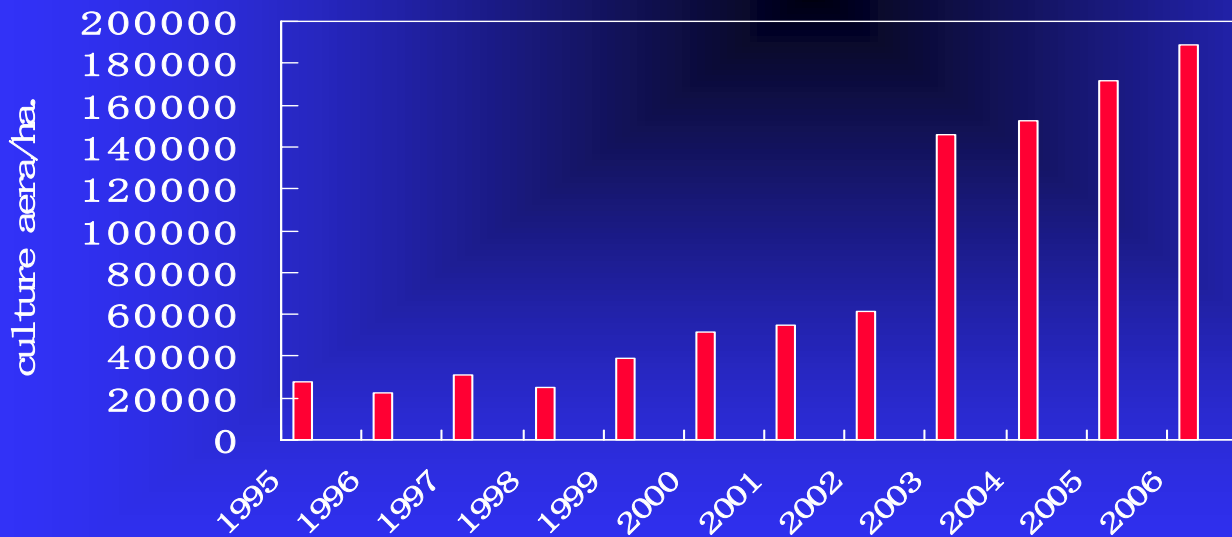
Case study

A case study on maricultural activities based on species may give some basic hints for consideration

- Shrimp farming
- Scallop farming



Outputs of scallop mariculture

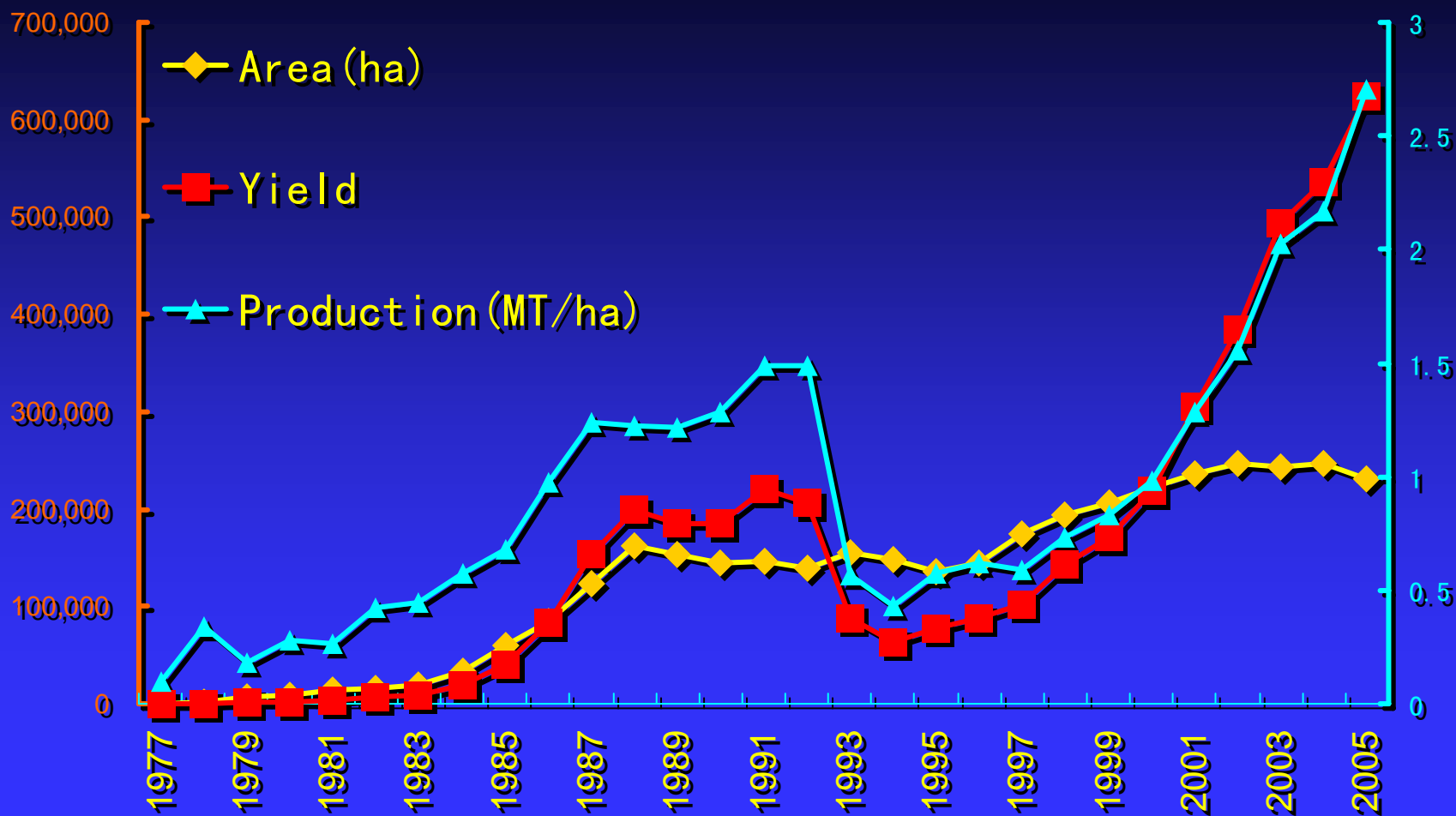


Areas of scallop mariculture

Massive mortality of farming scallop occurred in 1998 resulted in heavy economic loss, while the increase of scallop yield in recent years mainly relies on large-scale expansion of culture areas.

我国对虾养殖业的发展

Shrimp Farming Development in China



Some consideration

Analysis on farming characteristics

- Shrimp farming: a highly artificially controlled activity, from larva rearing, feeds and feeding, aeration, water exchange, disease control, etc.
- Scallop culture: seedlings are produced in hatcheries, while culture stages, except farming density, basically depend upon natural factors, including food supply, current, temperature etc., which means impacts of natural factors are inevitable.

Not conclusion, but...

There is no necessarily positive correlation between:

- mariculture scale and output,
- mariculture production and economic benefits,
- economic benefits and efforts.

基于生态系统的海水养殖业

Ecosystem-based mariculture

Expansion of aquaculture is necessary to meet society's growing demand for high quality seafood. While expansion of aquaculture is desirable, this goal can only be attained if future aquaculture efforts are fully integrated into coastal ecosystems. That is, facilities are planned for and sited in consideration of a full range of physical, biological, and chemical characteristics of coastal systems, and with full consideration of socioeconomic factors.

— — *Aquaculture and Ecosystem: An Integrated Coastal and Ocean Management Approach*. 2006. Published by World Aquaculture Society.

Some consideration

- Being confront with the nature, the impacts of human being's activity is great, but also insignificant. Dialectically understand and utilize the natural resources for aquaculture purposes are crucial for sustainable development.
- Ecosystem has its internal evolutionary regularity and established ecosystem usually is vulnerable. The key point is to make the best use of the natural resources, and to attain the optimum benefits.

Some consideration

There are two basic nature in aquaculture should be stressed:

- **Quality**: inputs (feeds, seeds, water, etc.) quality, quality control during farming, products quality
- **Sustainability**: do not produce negative impacts on ecosystem, and ensure the later generations to utilize the resources

Some consideration

A sustainable developed aquaculture means that it ensures not only the quality and output, also may develop in a way of sustainability

Technology innovation

- Scientific management of mariculture activities calls for improvement of technology. We need to learn more about carrying capacity, interactions between organisms and particularly the food web, relationships between organisms and their environment, impacts of human activities and social-economic aspects of mariculture.

Strategic transformation

- In China, in particular, a strategic transformation of the targets, approaches and measures is needed for mariculture industry. We are especially in need of a shift from quantity-oriented fishery to quality-oriented fishery and responsible fishery. We call for a full-range application of modern biotechnology and engineering in mariculture, in order to accelerate the mariculture development.

Development strategies

- Development strategies, including **Protection Strategy**, for protection and rational utilization of in-shore fisheries resource; **Exploitation Strategy**, for promoting stock enhancement and utilization of marine resources in the deep sea and the high-seas; **High-tech Strategy**, for upgrading technology in all sectors of mariculture.



THANKS !

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