The Maldives Opportunity in Global Sustainable Aquaculture Production and Business

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WORLD AQUACULTURE Society

AQUACULTURE WITHOUT FRONTIERS

WORLD AQUACULTURE SOCIETY ASIAN PACIFIC CHAPTER

Overview of this presentation

1. A little about me
2. History of aquaculture
3. Some Facts & Figures
4. The Maldives opportunity
5. Acknowledgments & Questions

Why I am here…

PLEASE ASSIST US WITH A ROADMAP FOR ESD OF AQUACULTURE

Influences on the Journey

- Joined seafood industry in 1972
- Import, Export, Trading, Retailing
- SEA and SSA
- IAFI (Professor Mike Dillon, etc)
- WAS and WAS-APC
- John Connelly (NFI) & George Chamberlain (GAA)
- Dr Patrick Sorgeloos & Prof Barry Costa-Pierce
- Professor Michael Crawford, etc
- FAO/Globefish
- AwF – Michael New & Prof. Swaminathan

Conference Junky

Aquaculture

- Kuala Lumpur, Malaysia
- San Diego, USA
- Hobart, Australia
- Phuket, Thailand
- Porto, Portugal
- Gold Coast, Australia
- Kochi, India
- London, UK
- Natal, Brazil

Seafood

- Agadir, Morocco
- Paris, France
- Boston, USA
- Brussels, Belgium
- Wellington, NZ
- Reykjavik, Iceland
- Frankfurt, Germany
- Melbourne, Australia
- Santander, Spain

What is Aquaculture?

- An industry that encompasses the cultivation of aquatic plants and animals in controlled systems for commercial, recreation or resource management purposes.
- The most widely accepted short definition of Aquaculture is the cultivation of any aquatic (freshwater and marine) species of plant or animal.

History of Aquaculture

- Ancient Chinese manuscripts from the 5th century B.C. indicate the Chinese practiced fish culture.
- Egyptian hieroglyphics indicate the Egyptians of the Middle Kingdom (2052-1786 B.C.) attempted intensive fish culturing.
- Japan history shows they cultivated Oysters at around 2000 B.C.
- The culture of oysters established by the Romans is the first known form of aquaculture that has continued in some form or another to the modern day.

30,000 years ago - EEL traps in Hayward, Western Victoria, Australia

History of Aquaculture (2)

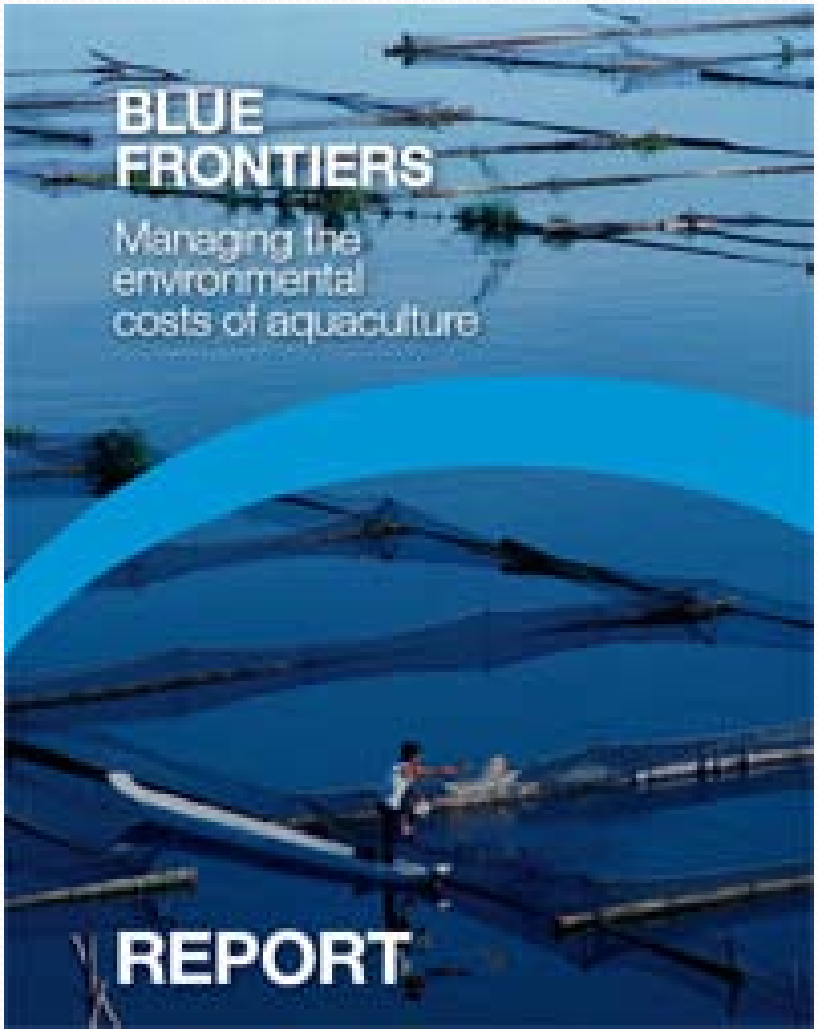
- Fish farming in its modern form was first introduced in 1733
- German farmer successfully gathered fish eggs, fertilized them, and then grew and raised the fish that hatched.
- Male and female trout were collected when they were ready for spawning. The eggs and sperm were pressed from their bodies and mixed under favorable conditions.
- After hatching, the fingerlings were taken to tanks or ponds in which they were cultivated.

Asia Pacific Importance

- Aquaculture is the fastest growing food production industry. It all started in Asia, especially in China, but it was only in the last 3 to 4 decades that spectacular growth took place.
- Asia and the Pacific are responsible for nearly 90 % of the production although value-wise Europe and Latin America make up 20 % because their aquaculture products fetch higher market values.

Aquaculture – more efficient, less damaging

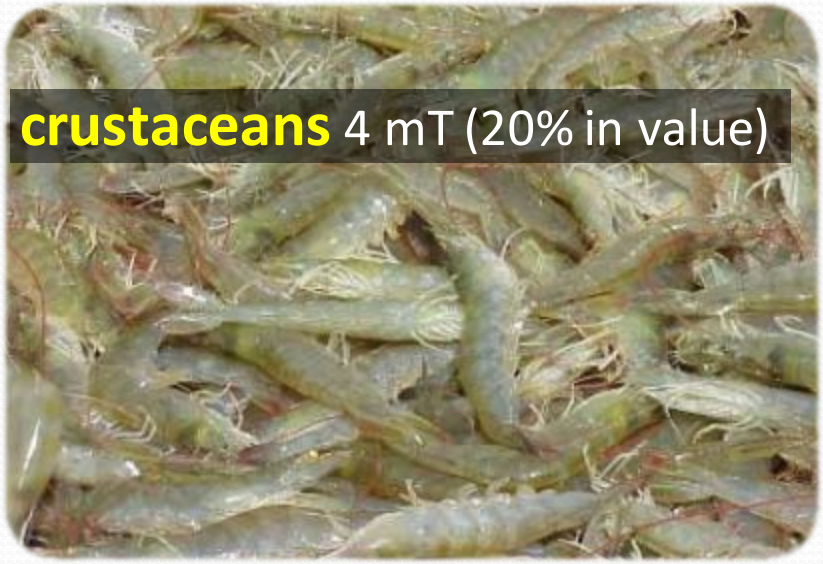
- Compared with either pork or beef, seafood converts a higher percentage of the food eaten into consumable protein
- Contributes less per unit weight to global emissions of nitrogen and phosphorus than pork and beef



Aquaculture Species

fish 30 mT (55% in value)

molluscs 14 mT (15 % in value)



crustaceans 4 mT (20% in value)

seaweeds 16 mT (10% in value)

Classifications of Aquaculture

- “Food Aquaculture” as practiced since millennia in Asia
- “Business Aquaculture”, the more recent developments in aquaculture which have resulted in new practices with different systems and species
- “Non-Food Aquaculture” e.g. Aquarium or Ornamental production

Food Aquaculture

- The millennia-old traditional farming of freshwater fish in ponds in Asia. This " food security" approach is mainly for the farmer's own needs or for catering for very local markets.
- Pond production practice is very important as it provides close to 15 million tons annually in China alone.
- Typical for this traditional style is the integrated approach: farming of fish in combination with other farming practices, fish in the ditches of the rice paddies, fish feeding on Periphyton, decaying plant material and insects

AQUACULTURE
WITHOUT FRONTIERS

Food Aquaculture (2)

- Or integrated with the farming of terrestrial animals, chicken, ducks and pigs, using waste and by-products as direct and as indirect food sources.
- Aquaculture produced for subsistence and/or local consumption should be done with the same level of care, but will not likely require the level of oversight as products for export.
- Be careful – remember Mad Cow…

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Business Aquaculture

- Recent phenomenon. Pioneered by the Japanese in '60's, further developed in Europe, the US, SEAsia, Australia, etc.
- Main principle is to engage in the farming of high market value species following capital intensive business models .
- Feasible due to new insights in the biology and life cycle of the target organisms, e.g. on how parental stock could be induced to maturation, the development of hatchery techniques allowed to grow massive quantities of fry, fingerlings could be stocked in high density grow-out systems. Similar to the plant and animal farming practices on land.
- Performed on a monoculture basis.

Examples of Business Aquaculture

- Cage structures (more or less sophisticated) in fjords and bays, eventually moving out more to open seas.
- Land-based systems can be operated in ponds.
- Concrete raceways or tanks.
- Recirculation systems (maybe at a higher cost) to produce fresh products, close to captive markets, often in temperate and cold climates.
- Supply-Demand principles typically see downward trend in prices.

Production Success Stories

- Norway and Atlantic Salmon
- Pangasius farming in the Mekong delta
- Penaeid Shrimp/Prawns
- Chinese Mitten Crab industry
- Mollusc farming
- Seaweed production
- Ranching

Why we need to be successful

- Hunger
- World population
- World reliance on land for food
- Oceans are 72% of the world but by volume 99%
- Capture Fisheries stagnating
- Seafood is connected with health
- Chronic disease is on the increase

Non-Food Aquaculture

Ornamentals –
Aquarium fish
Medical
Cosmetics
Fuel
Food

Problems, Issues, Challenges

- Disease
- Antibiotics
- Bio-security
- **Trade Barriers**
- Feed
- **Anti-seafood activities (external and internal)**
- **Food safety**
- **Collaboration Wild/Aqua & Marketing**
- Integrated approach - Success in production and sales, but not in profits (Pangasius bankruptcy).
- Lack of domestication of species
- Predictability of production
- Cost-efficiency
- **Certification & Standards**

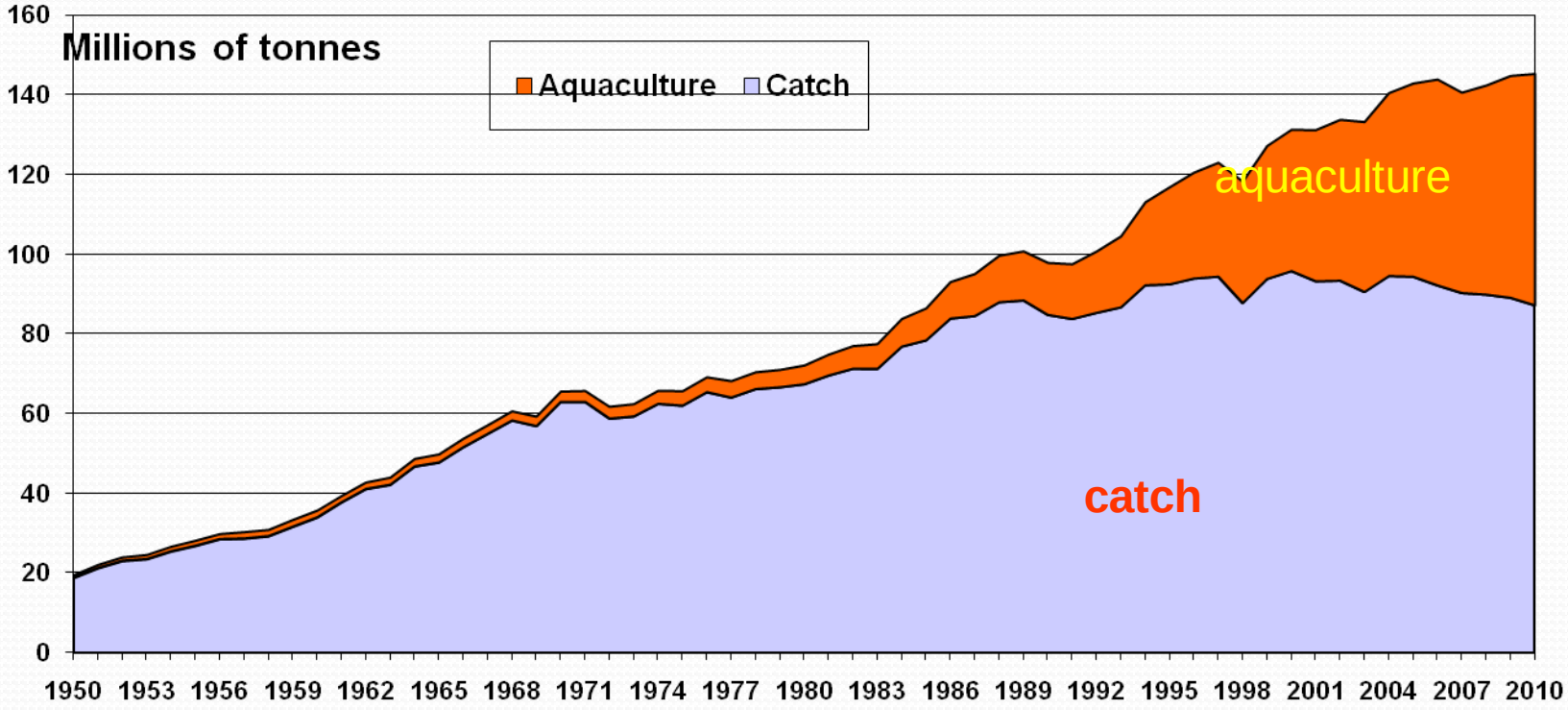
Problems, Issues, Challenges 2

- **Environment and overall sustainability**
- Climate Change
- **Developed countries increasing dependability on others**
- Pro-active attention for species selection
- Selective breeding
- Controlled bio-floc production
- Health control in aquatic animals
- Ecological principles and reconsider the monoculture approaches
- Integration of restocking activities with fisheries management
- **Statistics and Data**
- **Training & Education – Workforce Development**
- Bio-Marine products – medical, cosmetics, etc
- Social responsibility & Labor Standards
- Govt Policy & Regulations

World fish production

Million t	2009	2010e	2011e	2011/ 2010
Capture	89	87	89	1.8%
Farmed	56	58	60	4.0%
Total	**145**	**145**	**149**	2.7%

World Fish Production

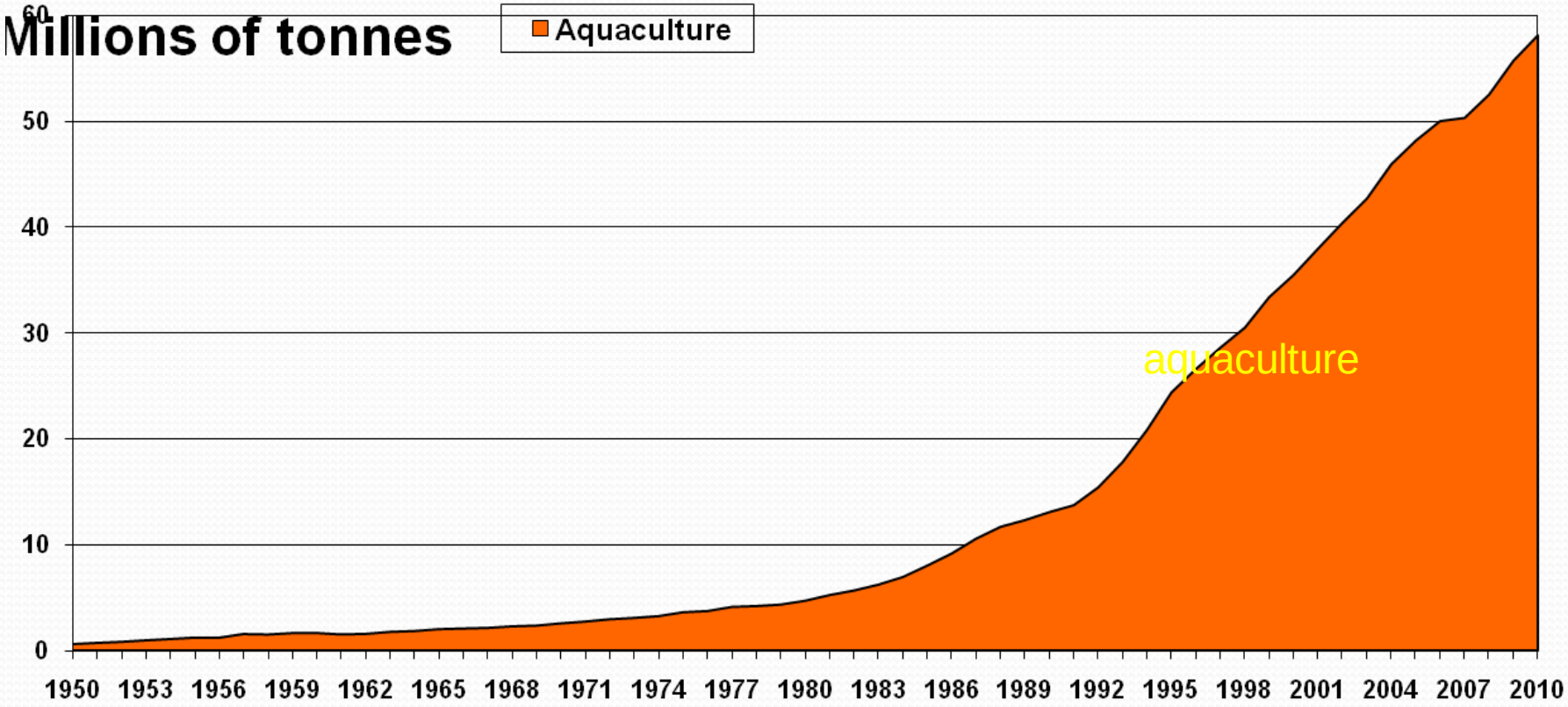


FAO

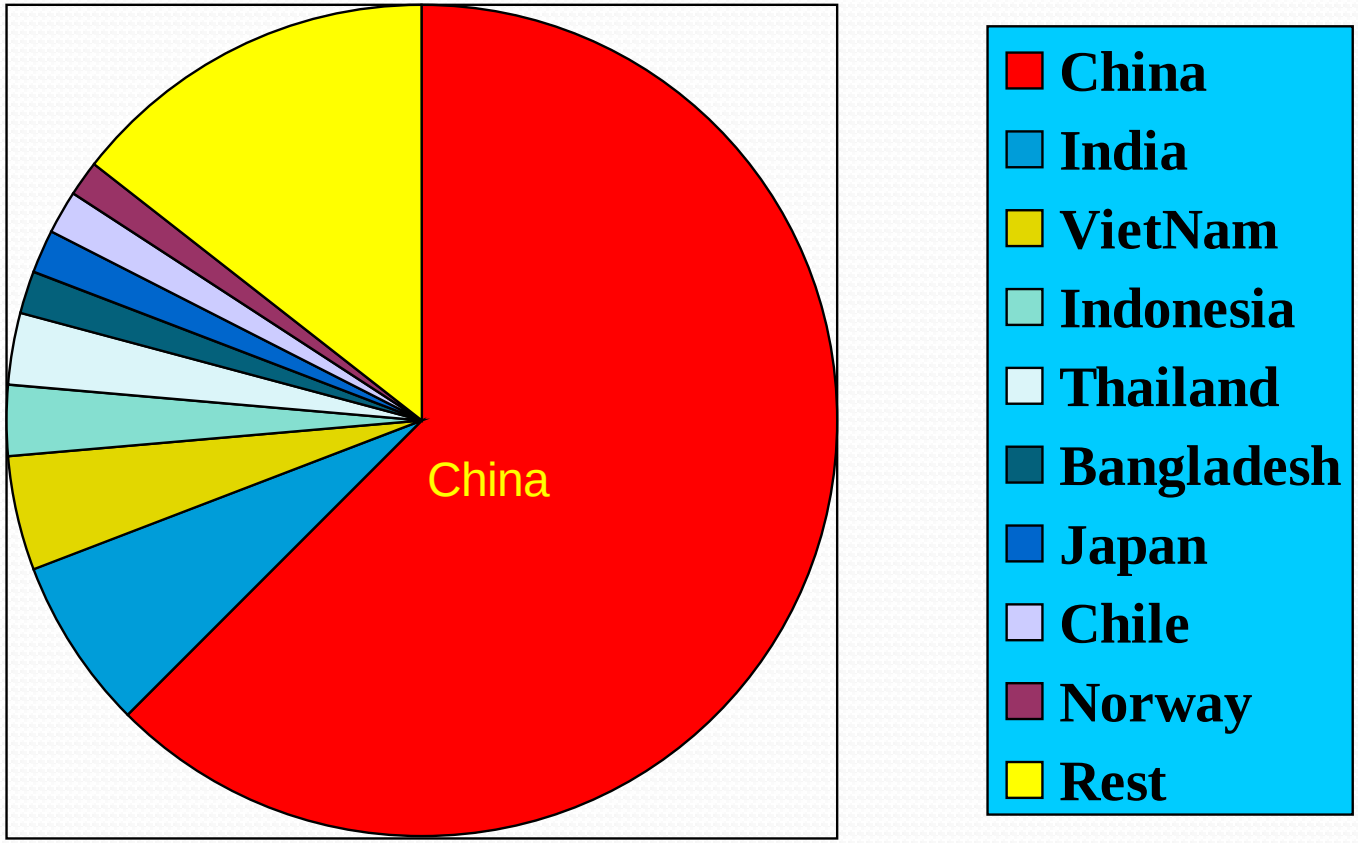
Per caput food supply

Kg/year	2009	2010	2011	2011/10
Food fish	17.2	17.3	17.4	0.3%
Capture	9.1	8.9	8.8	-2.1%
Farmed	8.2	8.4	8.6	2.8%

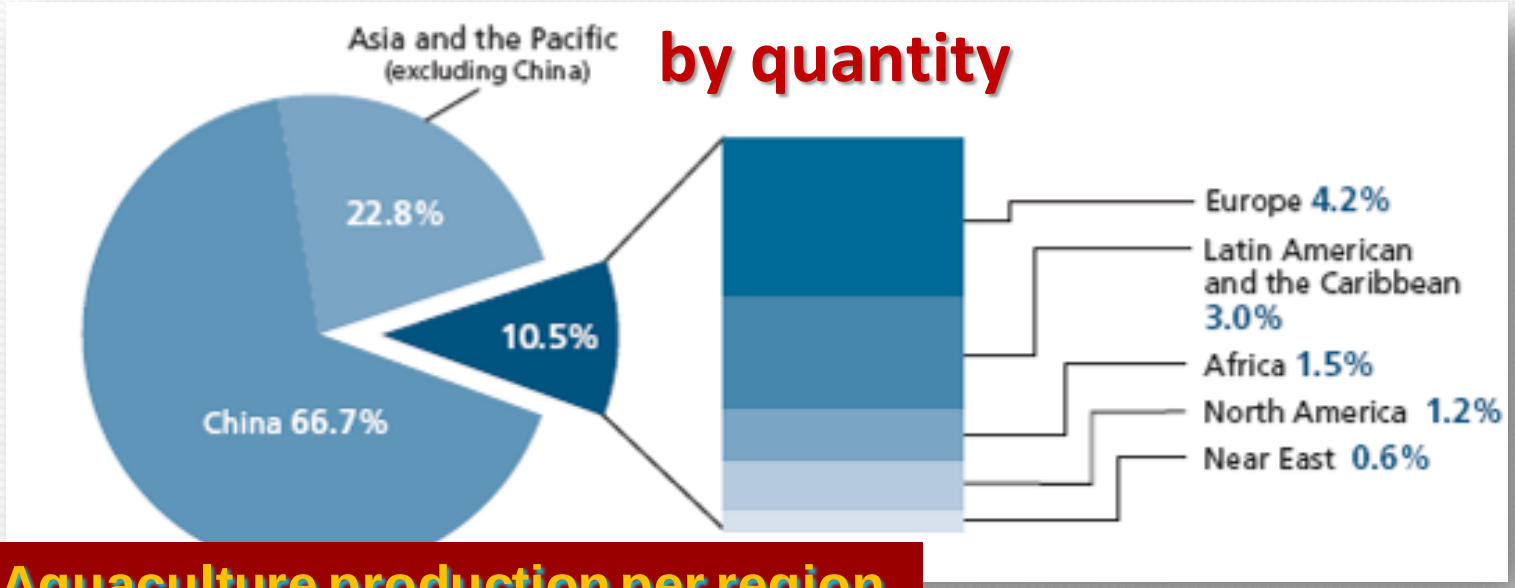
World aquaculture production 1950-2011: strong growth but slowing down



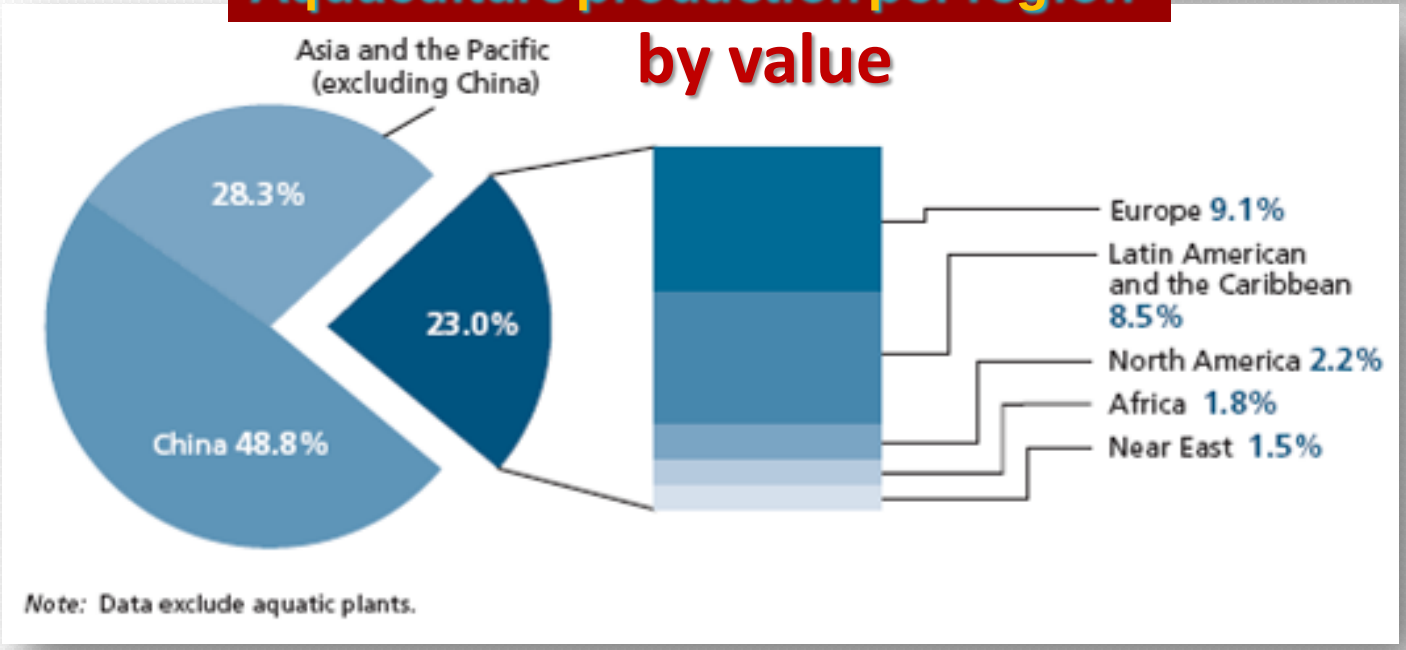
Aquaculture producers



Statistics



Aquaculture production per region

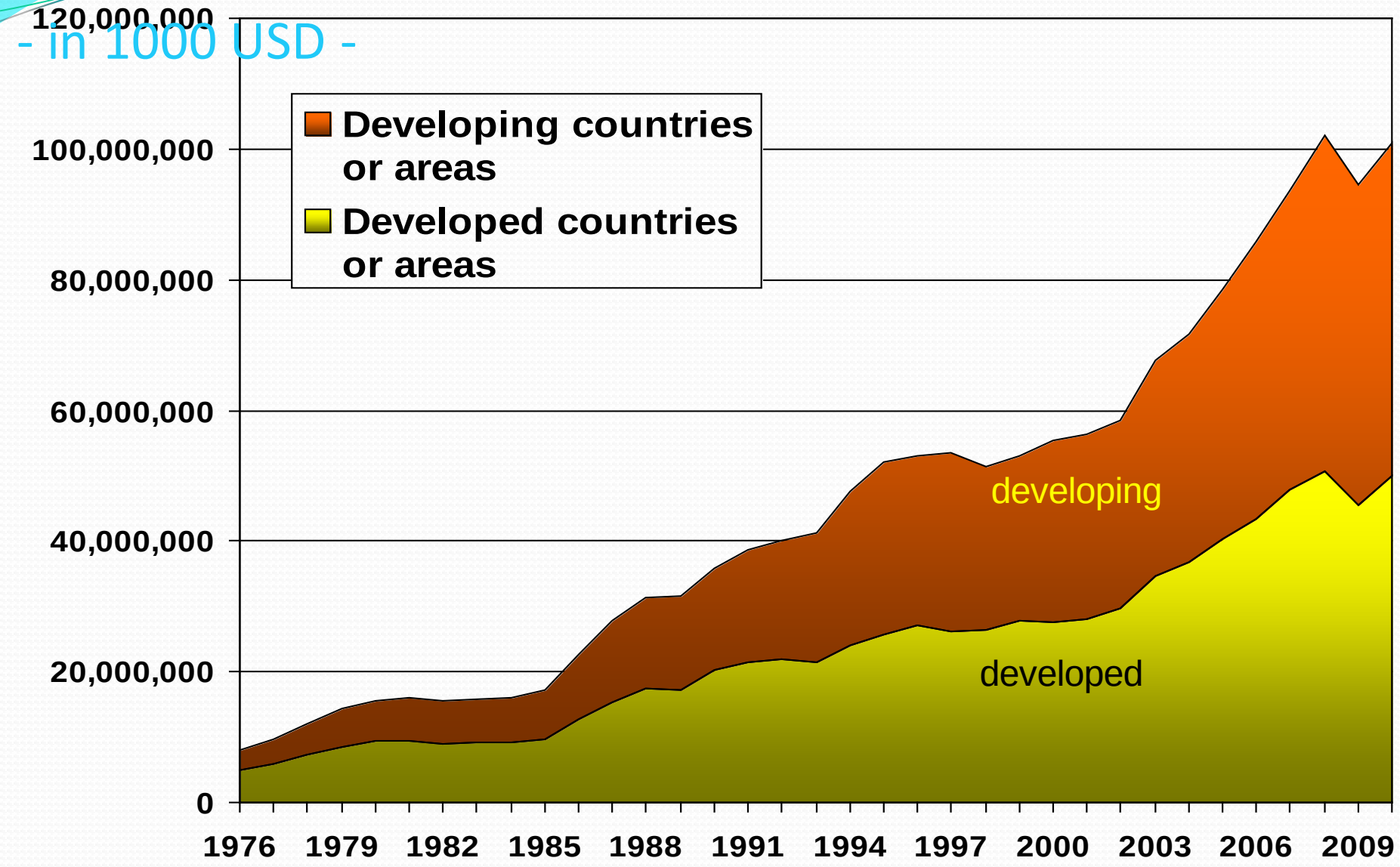


FAO, 2009

Global Awareness

- **Half of seafood imported by Developed nations comes from Developing countries**
- **Value US$43 billion pa**
- **The industry employs 45 million people**

World Fish Trade: Export Value



Fish market trends

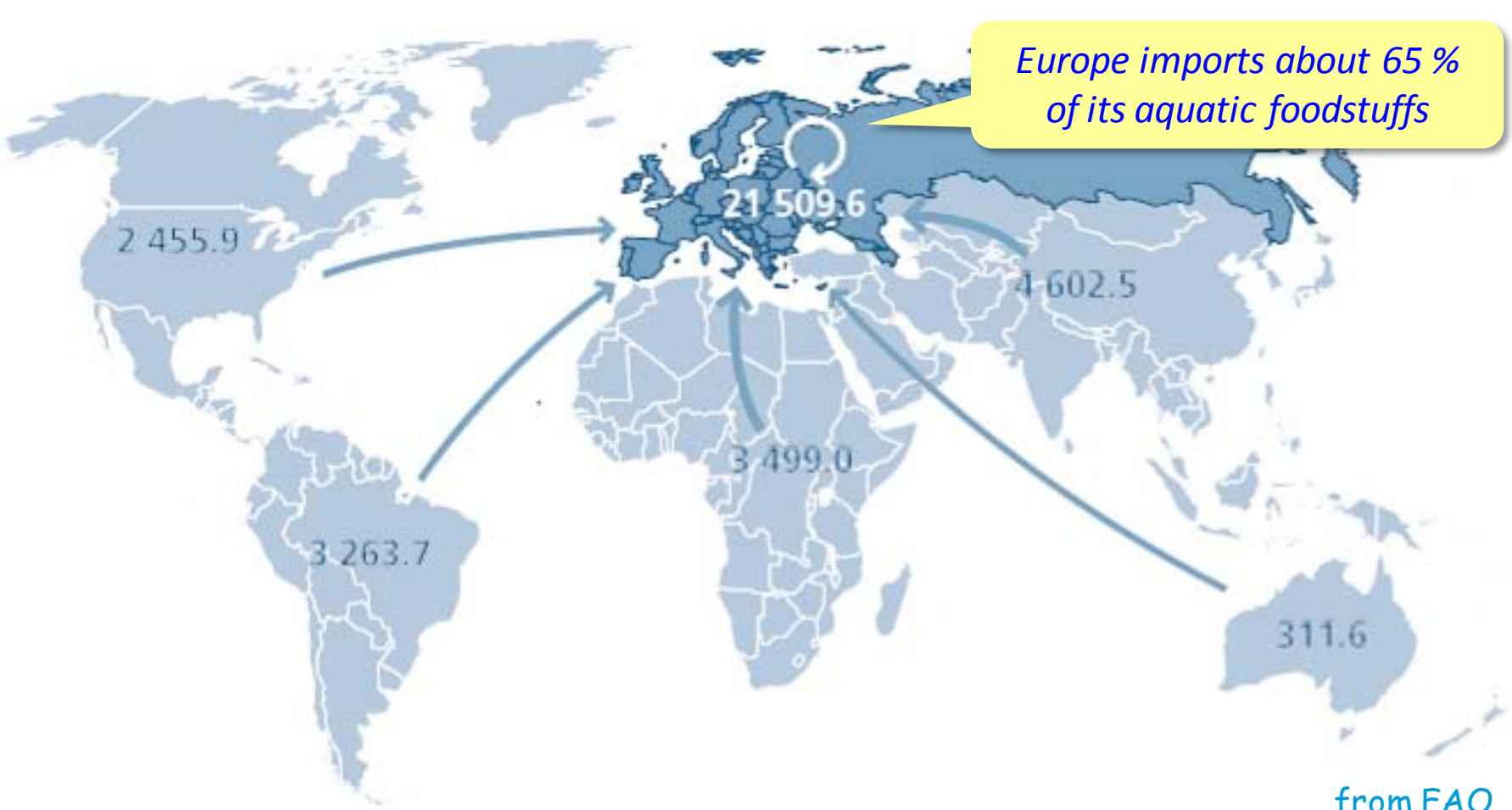
- **Japan**: long-term decline
  - high consumption but falling: 65 kg/kaput
  - imports fell below 3 million tons in 2007

- **USA**: long-term growth, overtaking Japan as # 1 country
  - rising population and consumption /kaput 24 kg (w/yearly variation)

- **EU**: long-term growth: # 1 market
  - expanding population, stable consumption at 20 kg
  - rising imports: e.g. catfish from Viet Nam, mussels from Chile
  - rising import dependency
- **Emerging markets**: strong growth in domestic demand

  Brazil, Mexico, India, China, Russia, Viet Nam etc

Flow of seafood into EU



from FAO

in US$ millions, c.i.f.; averages for 2004–06

Developed countries

- Increasing dependability on others due internal pressures
- Consumer spending in the US and other developed countries is not currently increasing as fast as that of many emerging economies such as Brazil, China and Southeast Asian countries. *
- Total dollar value of consumption in 'emerging' economies (combined…) passed that of the US in 2007 and now exceeds the US total.
- *JP Morgan Chase based on UN data

2010: new growth, new record

- **ESTIMATED EXPORTS: USD 105 billion (+ 10%)**
- **Volume : 55.2 million tons (+0.5%)**

- **It is prices and margins that increase more than volume**

FAO 2011 forecast

- **Exports USD 108.4 billion (+3.1%)**
- **Export volume 55.4 million tons (+0.4%) (live weight)**

Maldives Opportunity ?

The Need

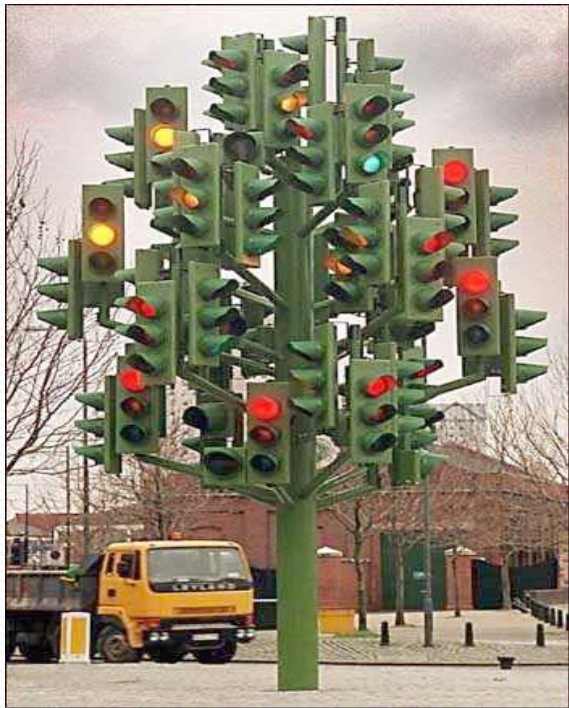
- 13,500MT White Fish Fillets imported per annum
- Tourism demand on increase
- Fishing on the decline
- Uncompetitive on Canned production
- Home Seafood Consumption high
- Improve Balance of Payments
- 6/7,000+ children leaving school each year
- Food security

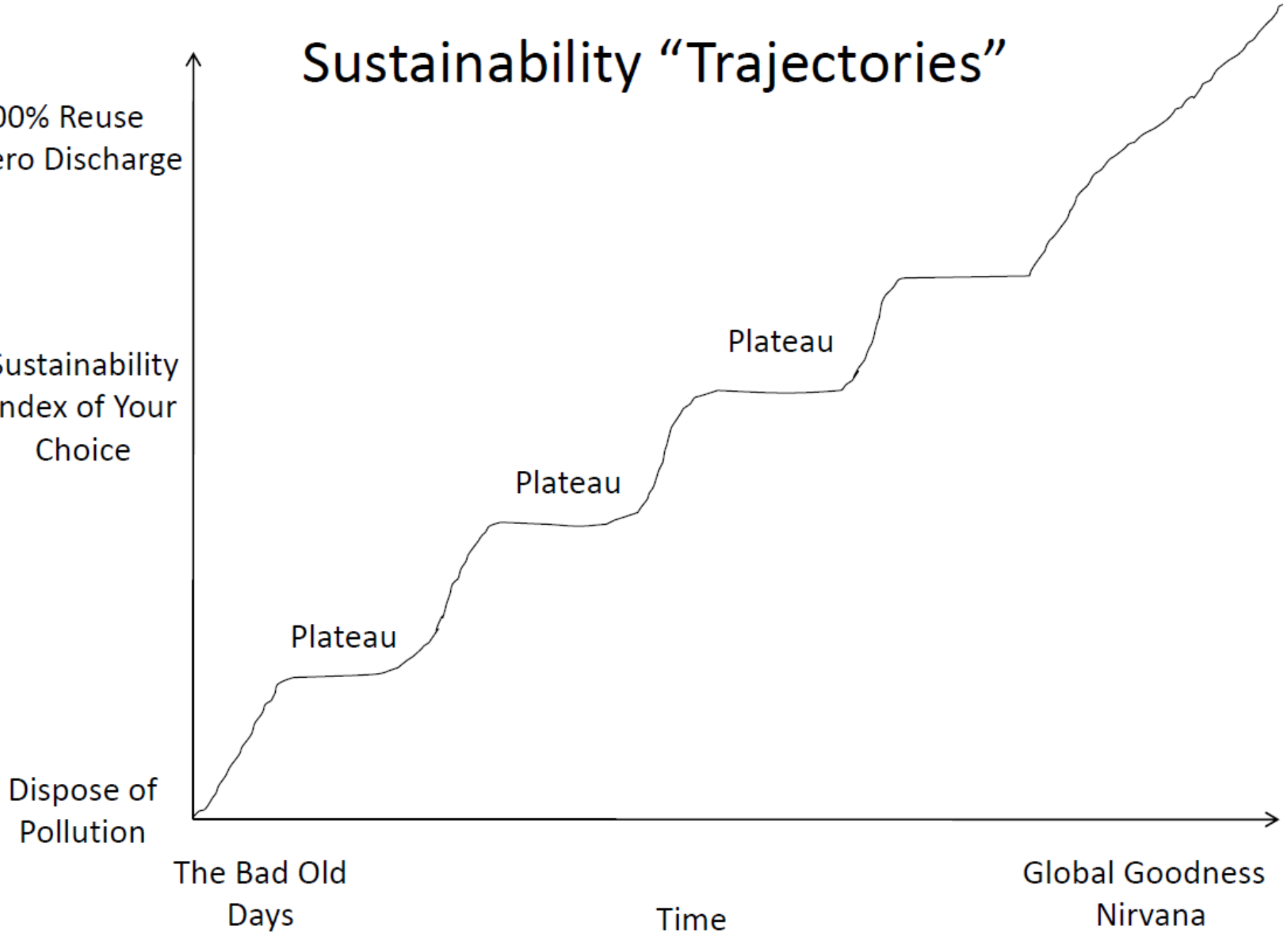
Advantages

- Good Marine infrastructure
- Plenty of scope with water
- Enterprising Government
- Research Institution
- Strong domestic market
- Keen participants with water as second nature
- Inclusion of Tourism to tell the story
- Opportunity to learn from others' mistakes
- WAS & AwF independent connections

Maldives Aquaculture Platform

- This is a Strategy
- It needs to be embraced by all – ego's left at door….
- It needs excellence in Governance, transparency, etc
- Food & Non Food
- Umbrella group at helm
- Formation of Committees
- Education & training focus
- Strong communication

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The Bad Old
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Time
Global Goodness
Nirvana

Area of Focus (AoF)

A geographically defined area that an ecosystem-based aquaculture project or program has decided to address and that therefore is the focal point for a baseline.

“Baselining”

form reference points against which future changes in the aquaculture ecosystem will be gauged

The first part of a baseline is an ecosystem audit of the AoF

define natural and social systems within which aquaculture is planned

The second part of the baseline is an outline of the strategic approach to designing a new aquaculture program, or adapting an on-going program

address the ecosystem management issues of the place in terms of economic, environmental, and societal benefits

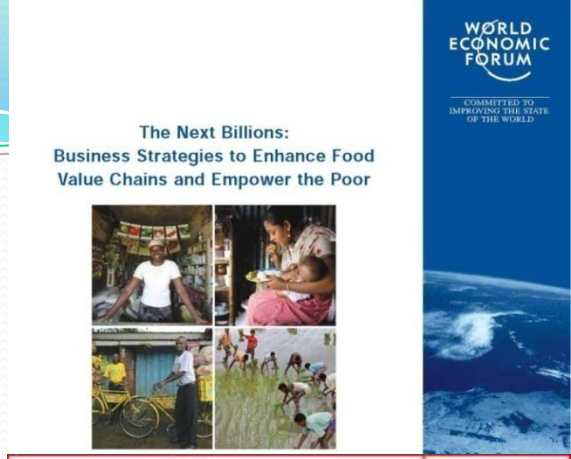
Encourage long-term perspective, an appreciation of the roles played by civil society, markets and government

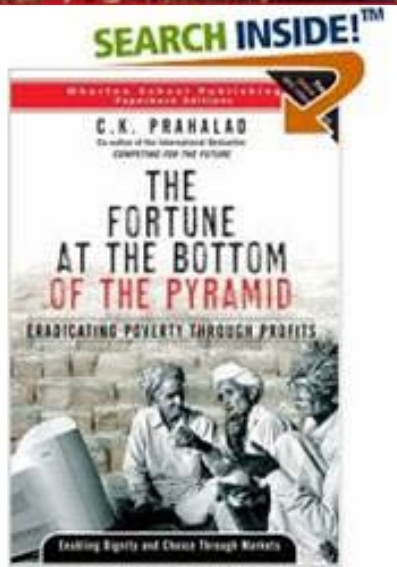
Maldives Aquaculture Platform

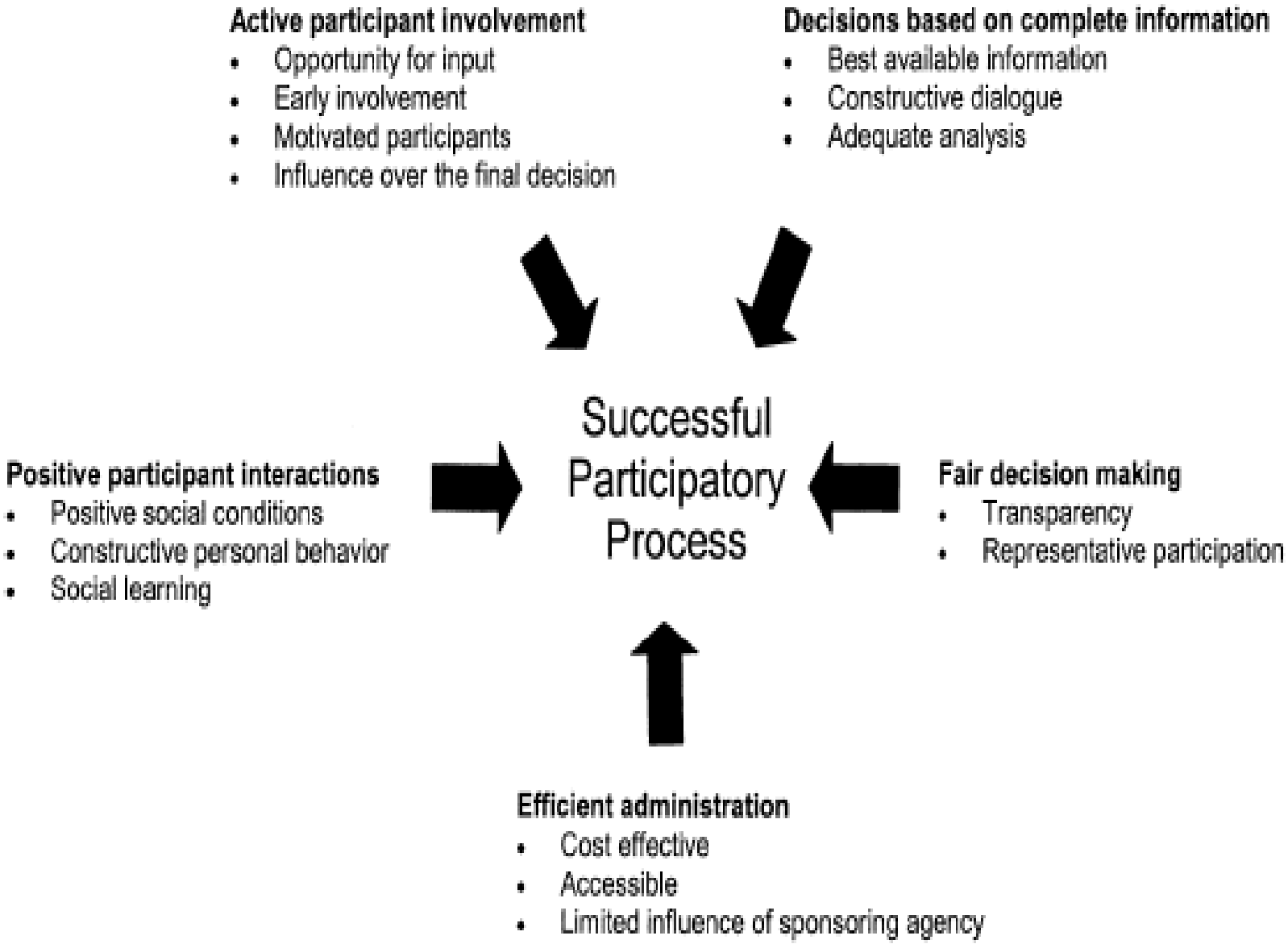
Being a strategy, the process is everything

The participation of stakeholders is at the base of the strategy.

- Organizations and institutions that are more effective at scale – public and private
- Emphasize small-scale groups etc
- Build effectively on existing/traditional institutions
- Need for institutions to support







Dalton (2005) Conservation Biology 19: 1392-1401.

1. Define the sustainability issues

2. Complete a sustainability assessment

3. Complete detailed risk analyses

4. Complete a plan for ameliorating identified impacts and unacceptable risks by incorporation of better/best practices

5. Complete a plan for communicating the evolution of operations towards greater stewardship and sustainability

Major Expressions of Governance

Government

- Laws and regulations
- Taxation and spending policies
- Education and outreach

Marketplace

- Profit seeking
- Ecosystem service valuation
- Cost-benefit analysis
- Eco-labeling and Green Products

Civil Society: Organizations and Institutions

- Product choices
- Advocacy and lobbying
- Vote casting
- Co-management
- Stewardship activities

First Order

Government at the national level commits to a plan of action designed to adopt an ecosystem approach to aquaculture (EAA) by issuing a formalized commitment to an EAA, thereby putting in place the ‘‘enabling conditions”

Indicators

New laws, programs, and procedures are initiated that provide the legal, administrative, and management mechanisms to achieve the desired changes in behavior by:

(i) ***building constituencies*** that actively support EAA with the user groups that will be most affected; with government institutions involved; and with the general public;

(ii) ***developing a formal government mandate*** for an EAA with the authority necessary to implement actions in the form of laws, decrees, or other high level administrative decisions that create an EAA as a permanent feature of the governance structure of aquaculture; creation of commissions, working groups, user organizations and non-governmental organizations (NGOs) dedicated to the advancement of an EAA agenda; designating EAA zones;

(iii) ***devoting resources***, especially sustained annual funding, adequate to implement an EAA;

(iv) ***developing an implementation plan of action*** for an EAA that is constructed around unambiguous goals;

(v) ***creating the institutional capacity*** necessary to implement the new EAA plan of action.

Second Order

Evidence of successful implementation of an EAA

Indicators

(1) Changes in the behavior of institutions and interest groups have occurred such as collaborative planning and decision-making through creation of task forces, commissions, civic associations, etc.

(2) ***Successful application of conflict mediation*** activities.

(3) ***Evidence of functional changes*** such as establishment of new public-private partnerships, new collaborative actions undertaken by user groups, implementation of new school curricula that incorporates an EAA.

(4) ***Changes in behaviors*** directly affecting ecosystem goods and services, such as the elimination of socially and environmentally destructive aquaculture practices.

(5) ***Investments in infrastructure*** supportive of EAA policies and plans.

Third Order

Evidence of sustained achievements in institutional and behavioral change due to an EAA as seen in the environment and indicators for the quality of life, incomes, or engagement in alternative livelihoods that have improved target communities

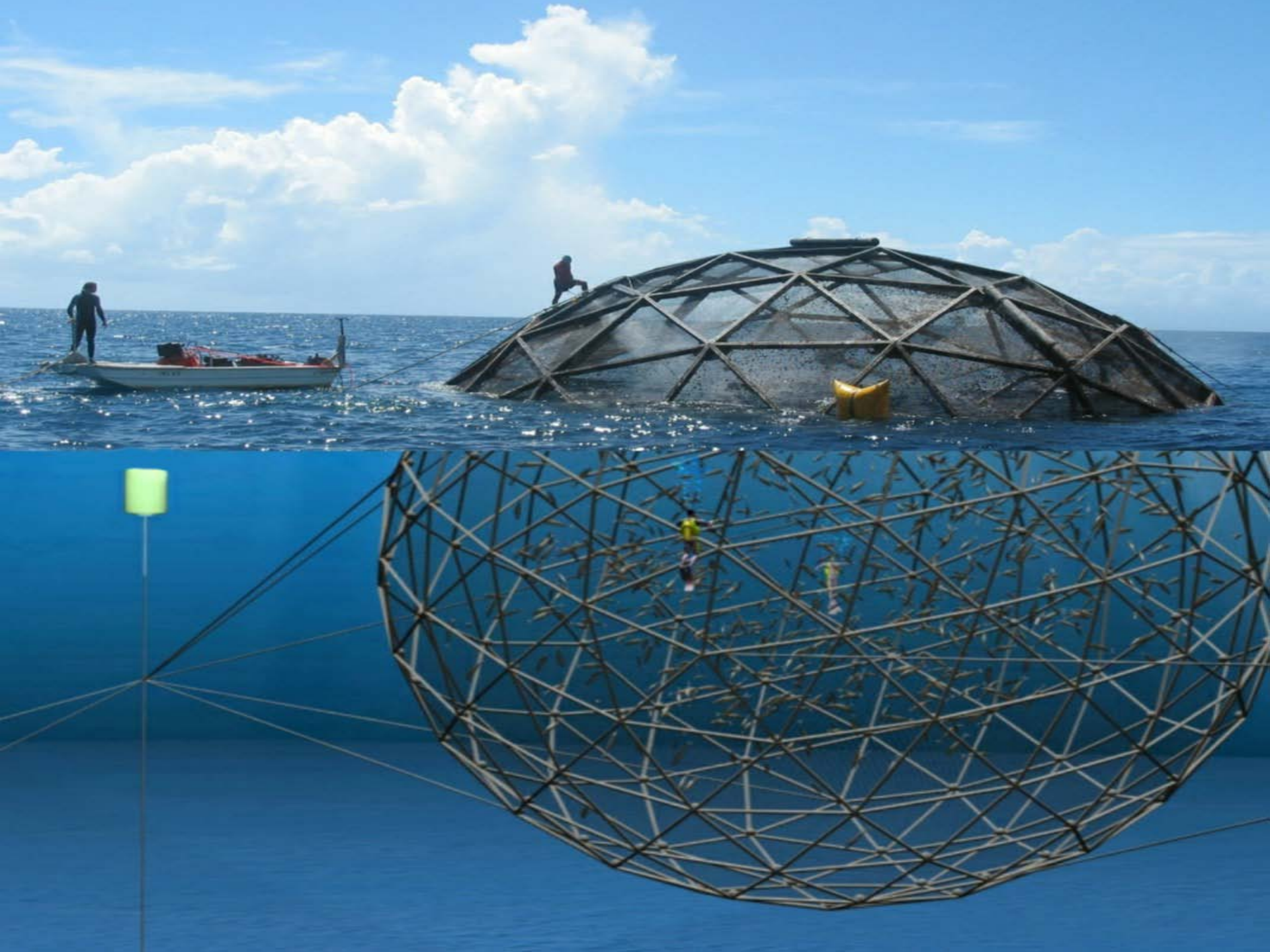
Indicators

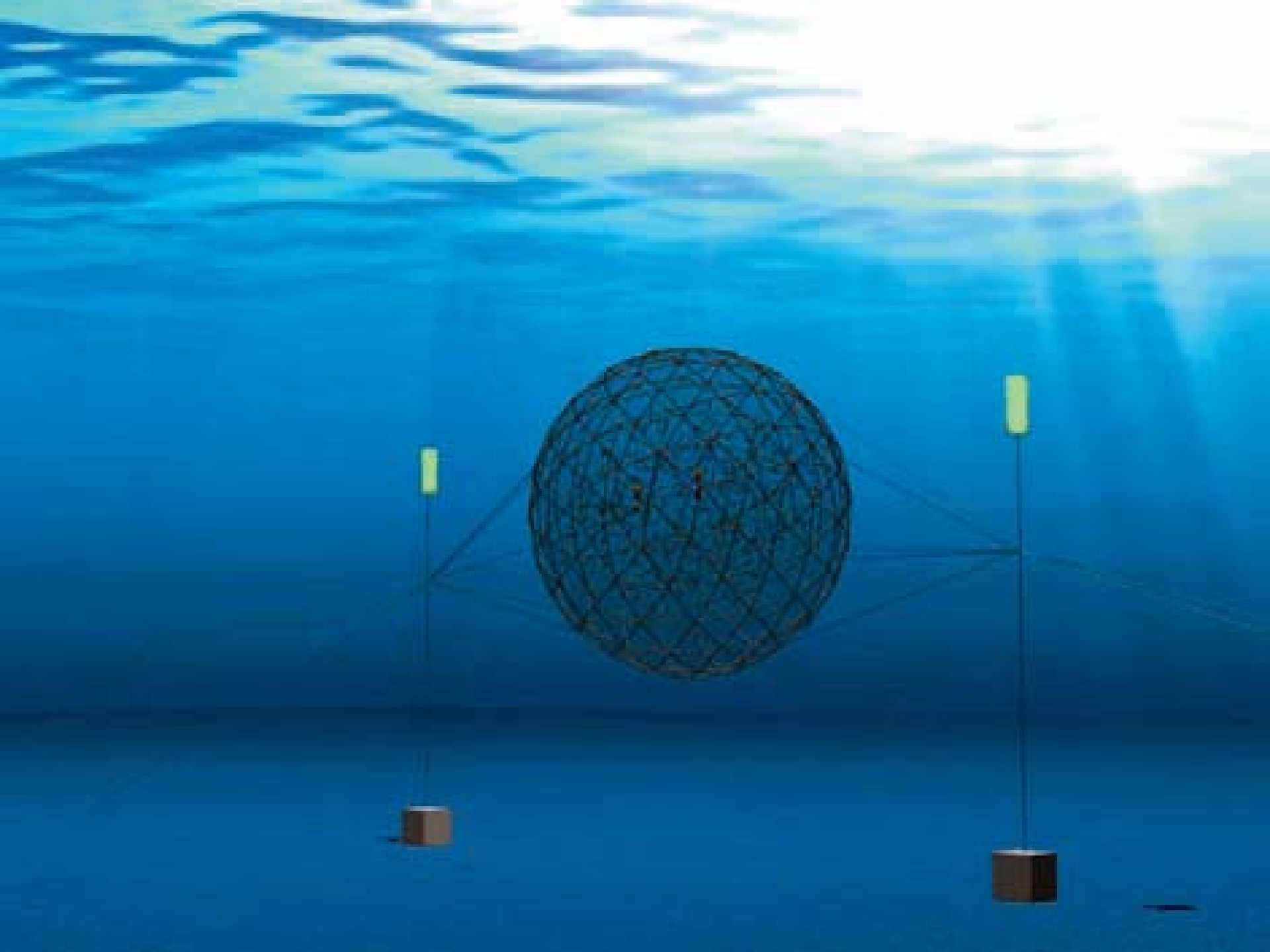
(1) ***Improvements in ecosystem qualities***, such as sustained conservation of desired ecosystems and habitats, halting or slowing undesired trends such as nutrient releases, feed wastage, diseases, damaged benthic ecosystems, etc.

(2) ***Improvements in society*** as evidenced by monitoring of social indicators such as increases in indices of quality of life, reduced poverty, greater life expectancy, better employment opportunities, greater equity in access to coastal resources and the distribution of benefits from their use, greater order, transparency and accountability in how planning and aquaculture development decision-making processes occur, greater food security, or greater confidence in the future.

Shrimp Aquapods in Mexico

Barry A. Costa-Pierce, Frank Hurd and Beau Perry
www.ecologicalaquaculture.org





Infrastructure Services

- Services should broadly support responsible aquaculture:
  - Economically viable aquaculture businesses enterprises from micro to larger scale
  - Access to input and output markets
  - Healthy, safe, nutritious products
  - Environmental responsibility
  - Social and community value
- Policy, legislation and institutional capacity




A wide range of services are required

Getting the right mix of services

Public policy and institutions

Farmer organizations and services "organizational glue"

Market connections

Productivity improvement

Working capital

Infrastructure investment

Finance and investment

- Recognize that public investments needed
- Innovative financing – eg climate change etc
- Sustainability, which will mean business oriented services (but, does this just mean big business?)
- Embed services into project investments
- Investment models that create value – for smaller players – social investments
- Longer term perspectives
- Invest in Communications
- Invest in Standards through inclusive activities
- Case Study opportunities

WAS Events - www.was.org

- **AQUACULTURE EUROPE 2011**
  Rhodos, Greece – Oct 18-21
- **AUSTRALASIAN AQUACULTURE 2012**
- Melbourne, Australia - May 1-5
- **AQUA 2012**
- Prague- 1-5 September

WORLD AQUACULTURE Society

IAFI World Seafood Congress 2011

- Washington DC – 1-6 October
- Workshops1 October
- Networks 2 October
- Congress 3-5 October
- Technical Tours 6 October
- IAFI
- NFI
- FAO
- UNIDO

Win-Win-Win Proposition

Grow fish + eat fish =

2 a week

- ***create employment and economic development***

  and at same time

- ***reduce hunger/famine***, and
- ***improve global physical and mental health***

AQUACULTURE WITHOUT FRONTIERS

Mahatma Gandhi 1869-1948.

Whatever you do will be insignificant, but it is very important that you do it. You must be the change you want to see in the world.

- HEP Mohamed Nasheed & Government
- MIFCo – Ali Faiz & his team
- Barry Costa Pierce & Patrick Sorgeloos & AwF
- Mario Stael – Marevent & WAS
- WAS-APC

Shukriyya
Thank You

Roy Palmer

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