



Global Conference on Aquaculture 2010

Farming the waters for People and Food

22-25 September 2010, Phuket, Thailand

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Global Review of Aquaculture Development

❖ Four Sections:

- **Section 1. Key characteristics of the global aquaculture sector**
- **Section 2. Aquaculture's contributions to food security, social and economic development**
- **Section 3. Sector developments that have contributed to dramatic growth**
- **Section 4. Salient issues, challenges and way forward**

Key characteristics of the global aquaculture sector

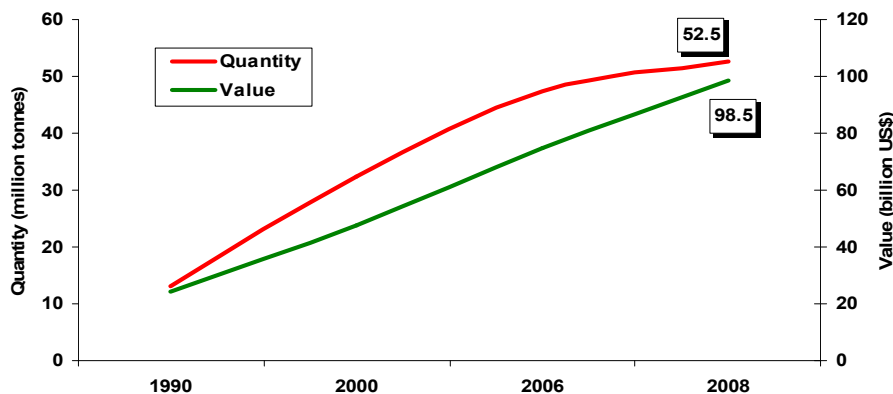
- ❖ Further expanded, intensified & diversified during the past decade
- ❖ Stagnating global capture fisheries
- ❖ Aquaculture perceived as having greatest potential



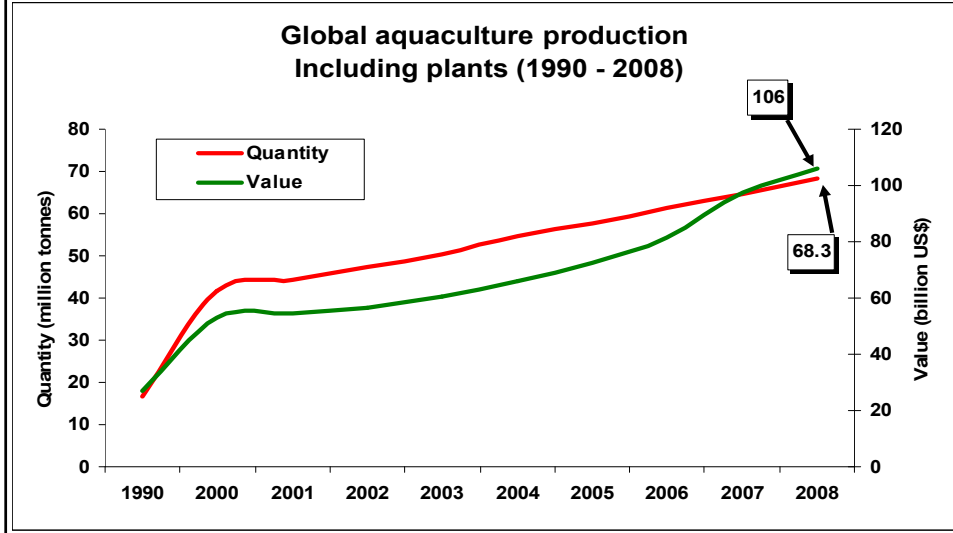
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Key characteristics of the global aquaculture sector

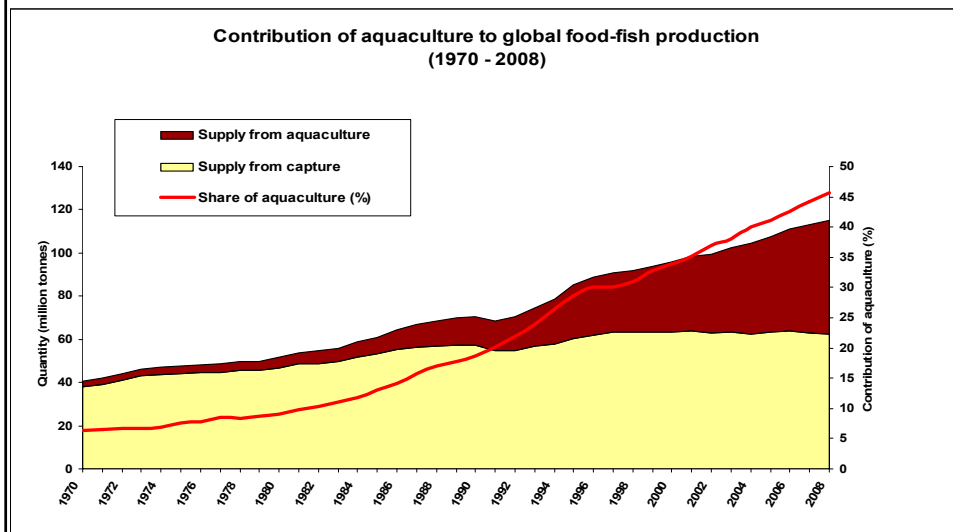
Global aquaculture production
Excluding plants (1970-2008)



Key characteristics of the global aquaculture sector

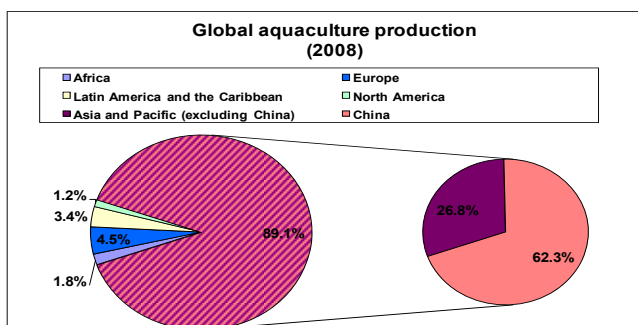


Key characteristics of the global aquaculture sector



Key characteristics Production by Region

- ❖ **Asia-Pacific: 89.1% (volume) and 78.7% (value)**
- ❖ **China: 62.3% (volume) and 51.4% (value)**
- ❖ **Growth is mainly driven by population and economic growth, technology development and expanding markets.**



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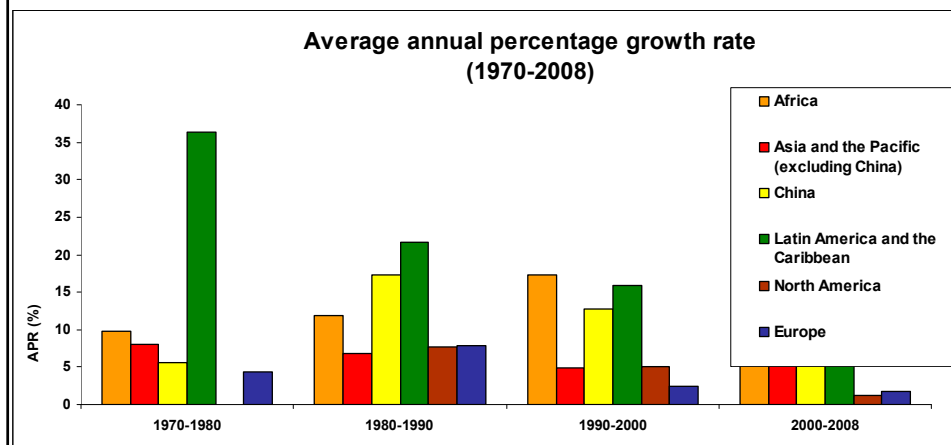
Key characteristics Growth Patterns

- ❖ **However, average annual growth rate is not uniform**
 - **Overall: 6.9% (1970-2006), 5.8% (2004-2006)**
 - **China: 10.4 % (1970-2008), 5.4% (2000s), 1980s (17.3%), 1990s (12.7%)**
 - **Europe and North America: 1.7 % and 1.2% (since 2000)**

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Key characteristics Growth Patterns

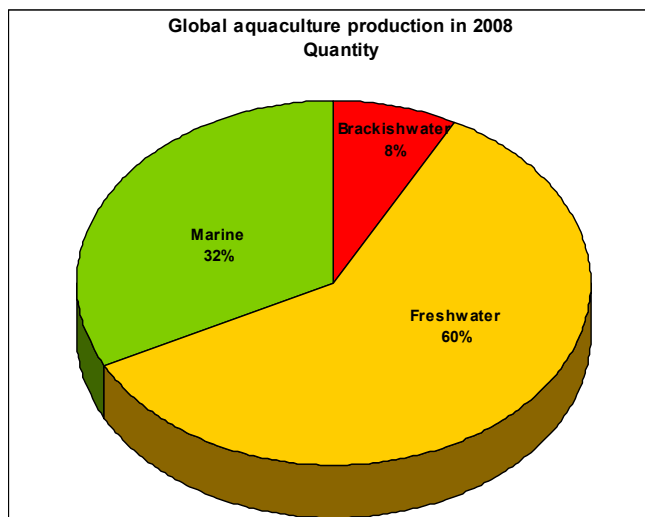
❖ World aquaculture will grow at reduced rate



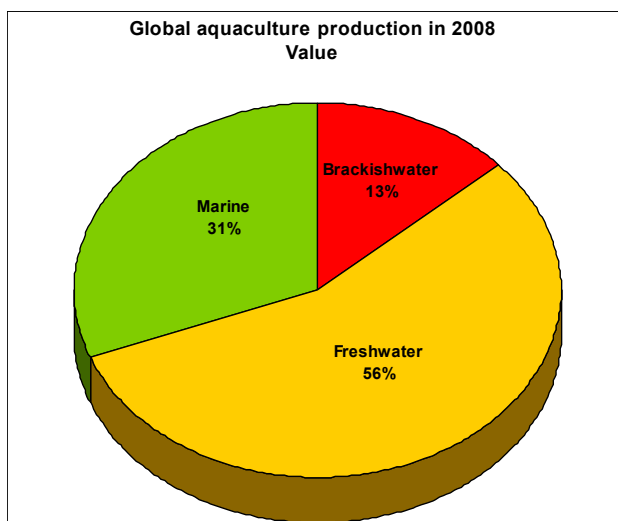
Key characteristics Top 12 Producers

Country	Production in 2008 (thousand tonnes)	Average annual rate of growth (2000-2008) (%)
China	32 736	5.4
India	3 479	7.6
Viet Nam	2 462	22.1
Indonesia	1 690	10
Thailand	1 374	8.1
Bangladesh	1 006	5.5
Norway	844	7
Chile	843	10.1
Philippines	741	8.2
Japan	732	-0.5
Egypt	694	9.3
Myanmar	675	27.1

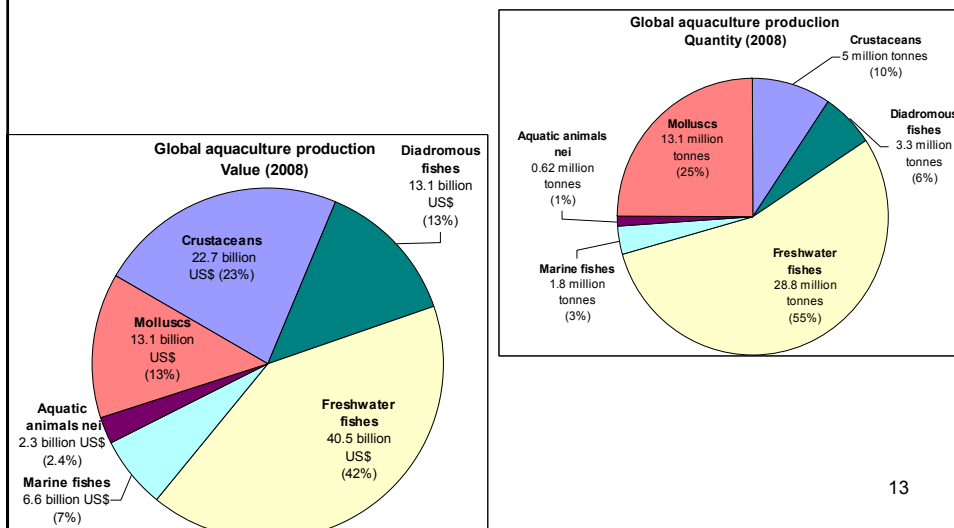
Key characteristics Production by Environment



Key characteristics Production by Value



Key characteristics Production by Species Groups

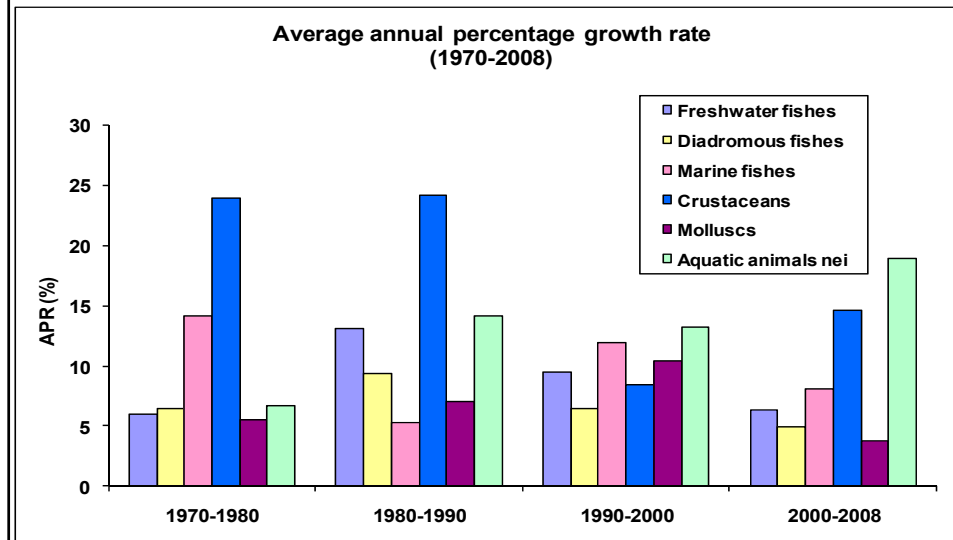


Key characteristics Production by Species Groups

- ❖ **Freshwater fishes:**
Carps 20.4 million tonnes, 71.1%)
 - China largest producer (70.7%) and India (15.7%)
 - Dramatic growth of *Pangasius* spp. in Viet Nam (1.2 million tonnes)



Key characteristics APR



Key characteristics Production of Introduced Species

- ❖ Made substantial contributions to global aquaculture
 - Tilapias: 2.4 million tonnes produced outside Africa in 2008
 - White-legged shrimp (*L. vannamei*) introduced to Asia from America and almost complete shift from the native black tiger shrimp (*P. monodon*)



Aquaculture's contributions to food security, social and economic development

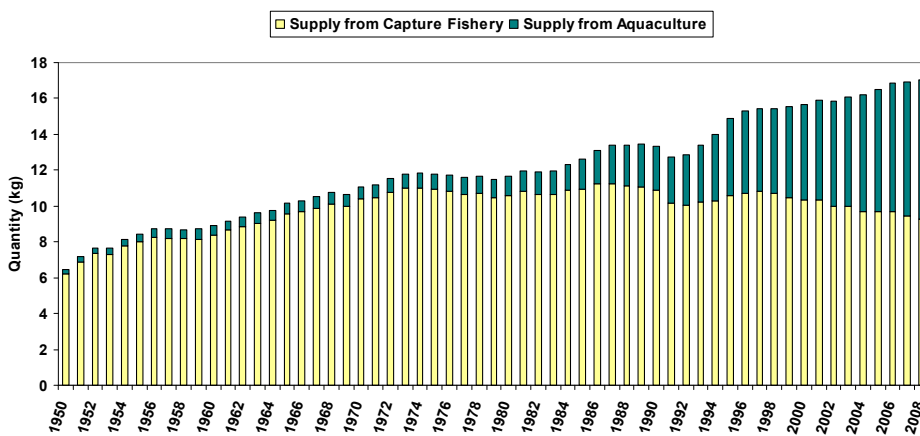
- ❖ Lack of precise data on impact of aquaculture!
- ❖ Aquaculture's contribution has increased significantly!

- ❖ Contribution to food security
- ❖ Fish are rich sources of protein, essential fatty acids, vitamins and minerals
- ❖ 1970-2008: Average annual per caput supply of food fish has increased from 0.7 kg to 7.8 kg.
- ❖ 20% of total animal protein in dev. countries (50% in some countries)

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Aquaculture's contributions to food security, social and economic development

Global per capita supply of food-fish for consumption (1950-2008)



Aquaculture's contributions to food security, social and economic development

- ❖ Provides direct and indirect livelihoods support to millions of people around the world
 - China (4.5 million, 53%) alone accounted for slightly more than half of the people employed
 - Decreased rural-urban migration
 - Enhanced women's empowerment



Contribution to social development

World fishers and fish farmers by continent (thousand people)

Region	1990	1995	2000	2005	2006
Africa	1 773	1 896	3 631	3 589	3 637
North and Central America	760	777	891	1 034	1 038
South America	730	704	706	702	708
Asia	23 766	28 118	34 781	36 650	37 338
Europe	654	498	812	734	725
Oceania	55	52	49	54	55
World	27 737	32 045	40 871	42 763	43 502

Of which fish farmers

Africa	3	13	107	111	108
North and Central America	3	6	75	300	301
South America	66	93	71	69	69
Asia	3 738	5 986	7 369	8 078	8 107
Europe	20	26	44	71	73
Oceania	1	1	5	4	4
World	3 832	6 124	7 672	8 632	8 663

Source: SOFIA 2008

Contribution to economic development

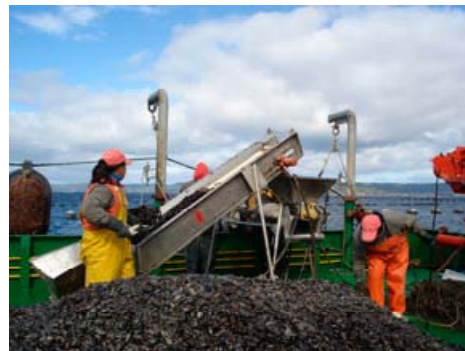
- ❖ **Valuable contributions to local, national and regional economies**
 - In many countries aquaculture's contribution to GDP is small, but is important for poverty alleviation and nutritional benefits
 - Asia-Pacific region's contribution is relatively higher
 - Europe: 0.02% of the region's total GDP of 20.2 trillion US\$
 - Africa: small contribution, ranging from less than 1 % (NENA) to 5.3% (Gambia)

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Source: SOFIA 2008

Sector developments that have contributed to dramatic growth

- ❖ **Good governance and management of the sector**
- ❖ **Impressive development of aquaculture markets and trade**
- ❖ **Wide dissemination and use of information**



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Good Governance

- ❖ Fisheries/Aq. policies, strategies, plans and legislations formulated
 - ❖ Examples: FAO PRSP study (2004), Southeast Asia study (2009), EU Common Fisheries Policy (2002 and 2008), EU Aquaculture Strategy (2002 and 2007)
- ❖ Africa: privatization policy
- ❖ Mandatory and voluntary international legal instruments
- ❖ International instruments: e.g. FAO Code of Conduct, Convention on Trade in Endangered Species (CITES),

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Good Governance and Management

- ❖ Economic incentives: important tool to motivate producers to invest in responsible aquaculture
 - tax holidays and enabling environment for privatization



Good Governance and Management

- ❖ **Producer associations (all regions) contribute to good governance and management**
 - **Influencing Policies and regulations and promoting COC and BMPs**
 - **FEAP's development of COC and 30 sustainability indicators, including BMPs (2008)**
 - **Catfish Farmers of Nigeria's sharing of knowledge on BMPs to members**

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Good Governance and Management

- ❖ **Data collection and management of aquaculture sector**
- ❖ **COFI Sub-Committee on Aquaculture identified data collection as a key priority (FAO, 2005) area**
- ❖ **FAO has initiated measures to improve reporting of COC**
- ❖ **NA (Canada) has an advanced data reporting system (Follows Sustainability Reporting Model provided by Global Reporting Initiative)**



Market Development

- ❖ **Main markets and trade characteristics:**
 - Markets range from domestic to regional to international
 - Consumers' demand also vary (live fish to processed fish)
 - 2008: world exports (99.5 billion US\$; 50% developing countries);
 - world imports (104.7 billion US\$; 80% developed countries);
 - top ten exporters (3 from Asia-Pacific, China largest)

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Global Fishery Exports 2008

Country	Value (billion US\$)
China	10.1
Norway	6.63
Thailand	6.5
Viet Nam	4.51
USA	4.26
Denmark	4.00
Netherlands	3.95
Canada	3.67
Spain	3.41
Chile	3.35



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Market and Trade Characteristics



- ❖ New markets are emerging (both low and high value species)
- ❖ Increasing globalization of fisheries value chain (outsourcing)
- ❖ Food safety, traceability, certification and eco-labeling are increasingly becoming important (response to consumers' concerns)

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Certification



- ❖ Increasing demand for certification
- ❖ Need for harmonization of standards
- ❖ Two global-level developments on certification:
 - FAO: animal health and welfare, food safety,
 - environmental integrity and social-economic aspects
 - WWF: 12 species, minimize/eliminate environmental and social impact
- ❖ Organic aquaculture: relatively new and limited to few countries and species

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Information

❖ Benefits:

- reduces costs, better policies and plans

❖ Achieved through:

- Research & Development; training & networks; ICT



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Research and Development

❖ Europe and NA:

- ❖ rich aquaculture research environment

❖ Asia-Pacific:

- ❖ research output and funds have increased
- ❖ Contributed to closing of the life cycle of southern bluefin tuna and the development of Genetic Improvement of Farmed Tilapia (GIFT).

❖ Africa:

- ❖ preliminary stage (except few countries)

❖ LAC:

- ❖ move from basic research to practically-oriented research

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Training

- ❖ **Europe and North America:**
 - ❖ leading academic and research institutions on aquaculture
- ❖ **Asia-Pacific:**
 - ❖ level of aquaculture education and training has increased significantly
 - ❖ (e.g. in Viet Nam, the aquaculture faculties increased from two in 2000 to eight in 2010)
- ❖ **Africa:**
 - ❖ various initiatives to increase qualified aquaculture scientists (e.g. Fisheries University Network - FishNet)

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Networking

- ❖ **Europe:** Network of Aquaculture Centers in Central-Eastern Europe (NACEE); AQUA-TNET
- ❖ **North America:** World Aquaculture Society (WAS)
- ❖ **LAC:** Network of Aquaculture in the Americas (*Red de Acuicultura de las Americas*, RAA)
- ❖ **Africa:** Sustainable Aquaculture Research Networks in sub-Saharan Africa (SARNISSA); Aquaculture Network for Africa (ANAF)
- ❖ **Asia-Pacific:** Network of Aquaculture Centres in Asia-Pacific (NACA)
- ❖ **NENA:** Regional Fisheries Commission (RECOFI) established a Working Group on Aquaculture (WGA)

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Communication



- ❖ **New opportunities to communicate, analyse data, impart training and share knowledge**
 - ICT-driven models (assisting small scale farmers in remote regions)
 - Voice over internet -VOIP (Eg. Aceh, Indonesia)
 - Geographic information systems (GIS); remote sensing and mapping
 - Aquatic Commons (FAO)

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Salient issues, challenges and way forward

- ❖ **Resources: Land and Water**
 - Conflict of interest and competition (E.g. agriculture and tourism)
 - Maximize land and water use efficiency: an integrated approach (IA): IAF; IMTA; IAA.
 - Key element of the “ecosystem approach to aquaculture (EAA)
 - Future: mariculture or open waters

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Salient issues, challenges and way forward

❖ Resources: Seed

- **Supplied from wild produced and hatchery produced sources**
- **Hatchery produced source is expected to broaden in future**
- **Focus on quality seeds (e.g. hatchery mgt and establishment of regional broodstock mgt. centers)**

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Salient issues, challenges and way forward

❖ Resources: Aquatic Genetic Resources

- **Use and exchange of AqGR contributed significantly**
- **to global aquaculture**
- **Access & Benefit Sharing (ABS) issues are beginning to be raised**
- **Example: a move to allow Africa to access tilapia genetically improved in Asia.**

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Salient issues, challenges and way forward

❖ Resources: Feeds

- Debate on sustainable use of fishmeal and fish oil
- Use of “trash/low value” fish (e.g. marine cage farming in China) is also an issue
- Ecological and ethical concerns
 - 2008: 71% of fishmeal and 90% of fish oil were consumed in aquaculture practices
 - Production of fishmeal and fish oil: varied from 5-6 million tonnes to 1 million tonnes in the past 20 years despite continued growth in aquaculture
 - Fish in Fish out (FIFO) ratio falling: salmon = 1.7:1, all fed aquaculture = 0.5:1

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Salient issues, challenges and way forward

❖ Services: Aquatic Animal Health

- ❖ High priority (fish disease outbreaks)
- ❖ Preventive measures
 - National aquatic animal health management plans
 - Strengthen human capacity for diagnosis of fish diseases
- ❖ Europe: limited availability of licensed veterinary
- ❖ Medicinal products for fish health

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Salient issues, challenges and way forward

❖ Services: Aquaculture Capital

- **Access to timely, affordable and adequate capital (SSF, Africa and Asia)**
- **Asia (shrimp farmers, India) presents a good model**
- **Adoption of better management practices (BMPs) and formation of “aquaculture clubs/societies” and clusters**
- **reduce transaction costs; offer economies of scale**

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Salient issues, challenges and way forward

❖ Services: Aquaculture Insurance

- **Worldwide aquaculture insurance sector is at a preliminary stage**
 - **Premiums: US\$100 000 (1974), 50 million US\$ (2002), 100 million US\$ (at present)**
- **Europe is the best-served region in the world**
- **Small-scale farmers: a “hybrid approach” or “layered system” (FAO, 2007) is being developed in Thailand**
- **Combination of BMPs, mutual insurance schemes, insurance companies and government disaster relief systems**

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Salient issues, challenges and way forward

❖ Markets and Trade

- **Safeguard small-scale farmers (from stringent export requirements)**
- **Develop small-scale farmers into “cluster groups”**
 - (E.g. BMPs, India shrimp farmers)
- **Address tariffs (WTO rules)**
- **Adopt FAO’s Technical Guidelines for Responsible Fish Trade**
- **Provide adequate infrastructure development support**

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Salient issues, challenges and way forward

❖ Climate Change

- **Impacts on global aquaculture are not yet fully known**
- **General consensus among experts on impacts: rising sea-surface temperatures, sea level rise, increasing ocean acidification, extreme weather events, altered rainfall patterns and river flows.**
- **Resource poor people (women): likely to be most vulnerable**
- **Policies and strategies: enhance resilience and adaptability**
- **Adaptation measures: implementation of an EAA**
- **Application of BMPs, IA, IMTA, insurance, capacity building on forecasting and early warning systems**

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Salient issues, challenges and way forward

- ❖ **Global Economic Crisis**
 - impacts countries in varying degrees
 - aquaculture industry is not immune (e.g. developing countries: lower FDI and ODA)
 - FAO study (2009): increase in prices of feed ingredients
 - Coping strategies: e.g. lower FCR; improve natural productivity (e.g. use of fertilizers)

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Salient issues, challenges and way forward

- ❖ **Contributions of Aquaculture**
 - **Need for systematic and precise assessment of aquaculture contributions**
 - (Eg. food security and poverty alleviation) in order to formulate well-informed development policies and strategies
 - **FAO's recent initiatives (2009 and 2010) are positive (assessment framework & small-scale aquaculture)**

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Salient issues, challenges and way forward

❖ Public Perception

- Significant progress in facing environmental and social concerns tends to be overshadowed by some cases of unplanned management and improper aquaculture practices
- Nonetheless, aquaculture sector should take notice of concerns and project correct image in a transparent manner
- Eg. FAO's certification, WWF's standards EU CONSENSUS program's sustainability indicators are good approaches

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Continued Commitment

- ❖ To provide continued support to the sector
- ❖ Encouraging many governments and organizations remain committed
 - ❖ e.g. November 2009 World Summit on Food Security to assist small holders.
- ❖ It is hoped that, as the new decade unfolds, a stronger and confident global aquaculture sector will stand ready to face and overcome the future challenges and move further along the sustainability path

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Thank You!



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