Global Conference on Aquaculture 2010

Farming the waters for People and Food

22-25 September 2010, Phuket, Thailand

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Expert Panel Presentation II.2:

Aquaculture and Socio-economic Growth and Development: Enabling Policies and Partnership for Improved Benefits

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Global Conference on Aquaculture 2010
Farming the Waters for Food and People
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Outline

- Background
  - Conference on Aquaculture Development in the Third Millennium 20-25 February 2000 Bangkok, Thailand
    - Bangkok Declaration and Strategy for Aquaculture Development Beyond 2000
- Objectives
  - Review aquaculture's socio-economic impacts in the new millennium
  - Discuss institutional factors that facilitate aquaculture's positive socio-economic impacts and/or mitigate negative impacts

Literature

- Global situation
  - SOFIA 2006, 2008
  - The State of world aquaculture 2006 (FAO)
  - Aquaculture: Changing the Face of the Waters: Meeting the Promise and Challenge of Sustainable Aquaculture (World Bank, 2006)
  - Prospective analysis of aquaculture development: the Delphi method (FAO Fisheries and Aquaculture Technical Paper. No. 521, 2009)
- Asia's situation
  - Analysis of aquaculture development in Southeast Asia: a policy perspective (FAO Fisheries and Aquaculture Technical Paper. No. 509, 2009)
- Latin America's situation
  - Aquaculture development in Latin America: policy, institutional and economic dimensions (FAO Fisheries Technical Paper (forthcoming)

Bangkok Declaration and Strategy for Aquaculture Development Beyond 2000

- 2.1 During the past three decades aquaculture has become the fastest growing food-producing sector and is an increasingly important contributor to national economic development, the global food supply and food security;
- 2.17 The potential of aquaculture to contribute to human development and social empowerment cannot be fully realised without consistent, responsible policies and goals that encourage sustainable development;
- 2.18 The aquaculture sector should continue to be developed towards its full potential, making a net contribution to global food availability, household food security, economic growth, trade and improved living standard.

Socio-economic impacts of aquaculture

- Environmental responsibility
  - Habitat conservation
  - Land & water
  - Wild species
  - Energy
- Economic viability
  - Contribution to economic growth
  - Impacts on other industries
  - Competition within aquaculture
- Social acceptability
  - Poverty alleviation
  - Food security
  - Human development
  - Women empowerment
  - Community cohesion and social order

Institutional arrangements for environmentally responsible aquaculture

- Laws and regulations
- Environmental impact assessment (EIA)
- Environmental taxes
- Eco-labelling
  - Self-regulation
    - Codes of conduct
    - Farmers associations
    - Best or better management practices

Institutional arrangements for economically viable aquaculture

- Trade barriers
  - Tariffs
  - Anti-dumping
  - Market standards
- Public interventions in aquaculture production
  - Property rights
  - Seed production
  - Feed production
  - Capital
  - Foreign direct investments
  - Technology and know-how

Institutional arrangements for socially acceptable aquaculture

- Public policies
- NGOs
- Community-based aquaculture
- Co-management

Habitat conservation

- Progress
  - Stricter regulations
    - Clearing of mangroves for aquaculture banned in most Asian countries
  - Replanting and restoring
  - Coastal planning and management measures (zoning, EIA, etc.)
  - BMP (citing approaches, farm construction, feed management, etc.)
- Issues
  - Bottom ecosystem (coral reef, sea grass)
    - Organic wastes
  - Freshwater marshes and wetlands
    - Improper aquaculture practices

Land and water

- Positive impacts
  - Rehabilitating sodic lands
  - Providing nutrient rich mud
  - Reducing nutrient and heavy metal load in water
- Negative impacts
  - Land salinization
  - Eutrophication & algal bloom
  - Chemical pollution
- Measures
  - Planning and management (zoning, EIA, etc.)
  - Resource conserving aquaculture practices
    - Using land unsuitable for other purposes
    - Rotating use of land for agriculture and fish farming
    - Integrated operations (e.g. rice-fish farming)
    - Recirculation or closed water system

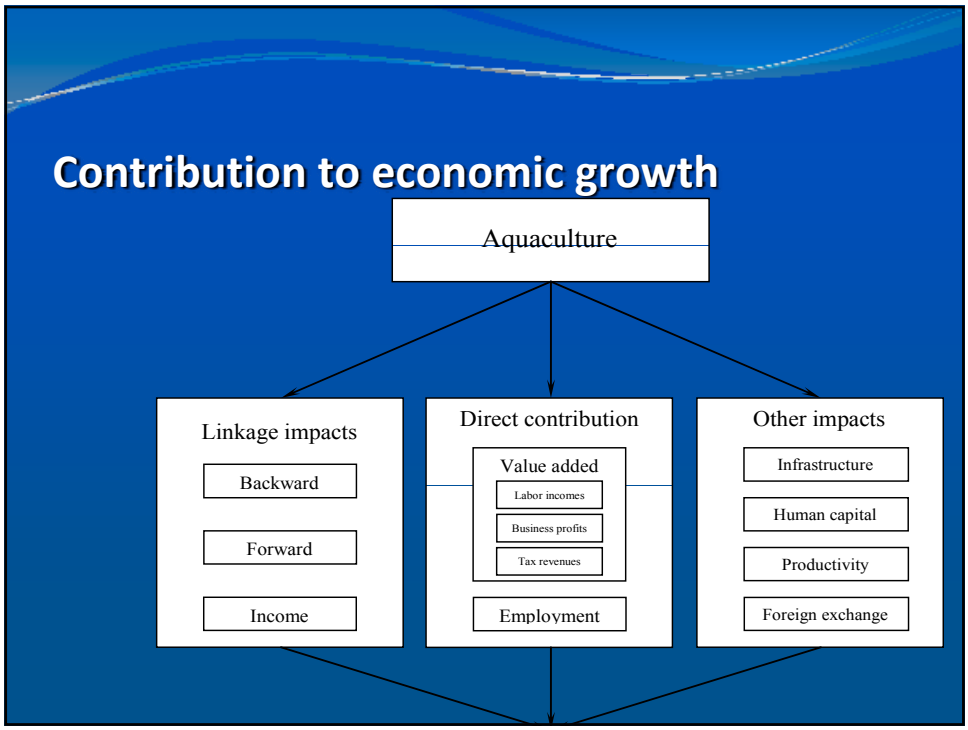
Wild species

- Positive impacts
  - Reducing pressure on fisheries
  - Restocking programs
- Negative impacts
  - Environmental degradation
  - Collection of wild species for seed
  - Introduction of exotic species
  - Aquaculture escapees
- Measures
  - Regulation on seed collection (licensing, official fry collection stations)
  - Artificial breeding
  - Removal of escapees as a precondition for farm licenses
  - Selecting sites with least impacts on wild stocks
  - Promoting aquaculture practices that prevent escapees

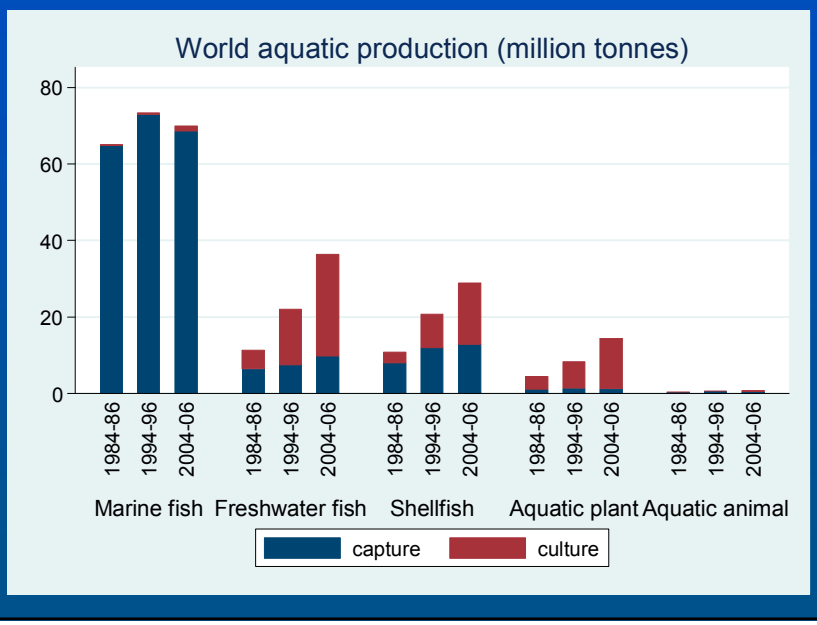
Energy

- Aquaculture operations require energy: Operation
  - Impacts of high energy prices (feed) on aquaculture?
  - Impacts system dependent
- Is water recirculation system more environmentally friendly?
  - Direct impacts on environment / indirect impacts through high energy consumption
  - Full lifecycle needed to evaluate the tradeoffs

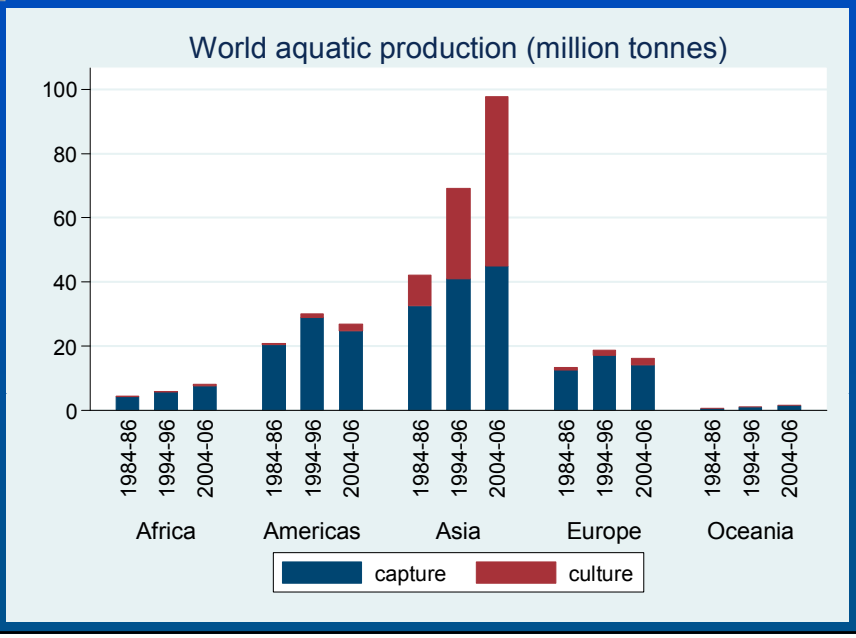
Contribution to economic growth



Aquatic production: capture vs. culture



Aquatic production: capture vs. culture



Measuring aquaculture's economic contribution-usually difficult for various reasons-Impacts on other industries

- Competition with other industries Agriculture, fisheries and tourism.
- Aquaculture as a less established newcomer not given priority-resource restriction and environmental impact surveillance.
- Complement to capture fisheries
  - Increasing demands for fisheries products
  - Reducing costs of seafood processing and marketing
  - Putting competitive pressure to make capture fisheries more efficient

Competition within aquaculture

- Positive impacts
  - Affordable seafood for consumers
  - Technology advances
  - Species diversification
  - New markets
  - Quality improvement
- Negative impacts
  - Trade disputes
  - Flooding the market

Pro-poor aquaculture

- Poor people lack
  - capital and access to credit
  - technical skills and management expertise
  - political influence and bargaining power
- Public support
  - tax exemption and subsidies
  - infrastructure construction
  - providing quality seeds
  - training and extension
  - technology innovations and transfer

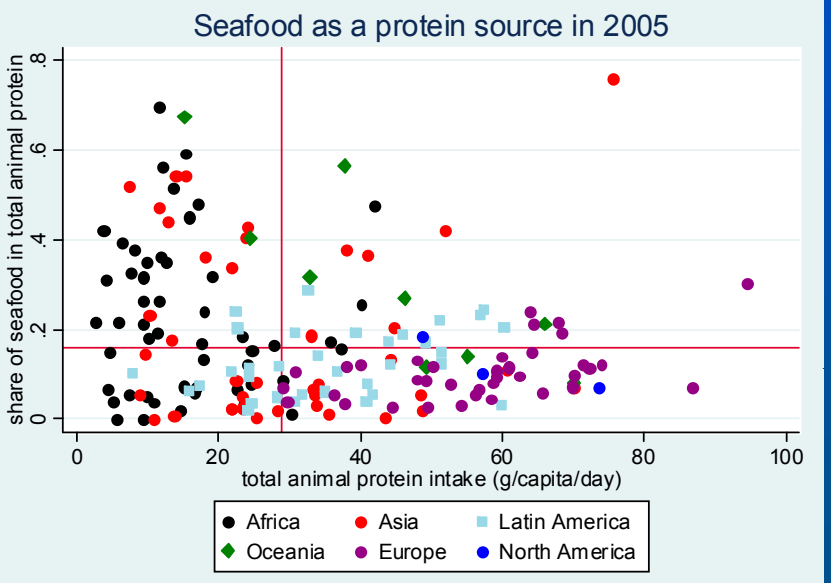
Pro-poor aquaculture: Small-scale operations

- Advantages
  - Less resource demanding
- Disadvantages
  - More flexible
  - Lack of economy of scale
  - Difficult to coordinate
- Successful stories
  - Thailand-Policies in place limiting farm size
- Less successful stories
  - Africa -Policies biased against large.
- High value vs. Low value

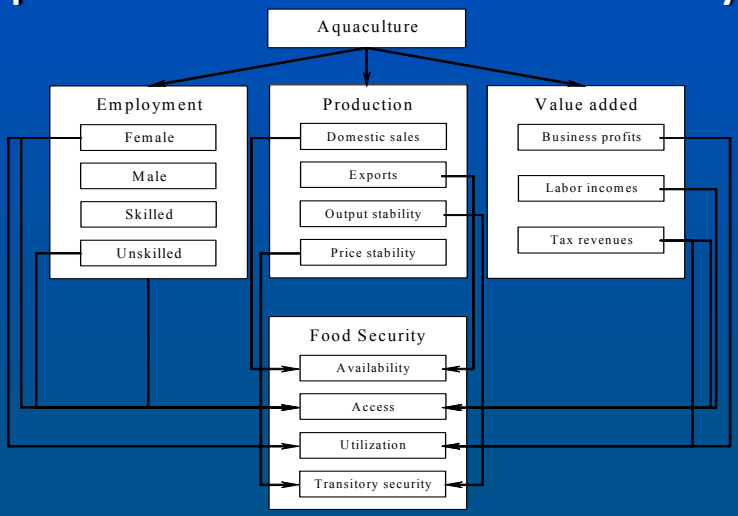
Pro-poor aquaculture: Large commercial operations

- Suspicion against large commercial operations
  - Profit driven-Exploit the poor to benefit the rich
- Merits of large operations
  - Economy of scale
  - Technology innovations
  - Benefits the poor through employment and economic growth
- Policy issues
  - Are regulations biased against large operations in Southeast Asia and Africa justified?
    - Can small-scale farmers compete with large companies in the international market?

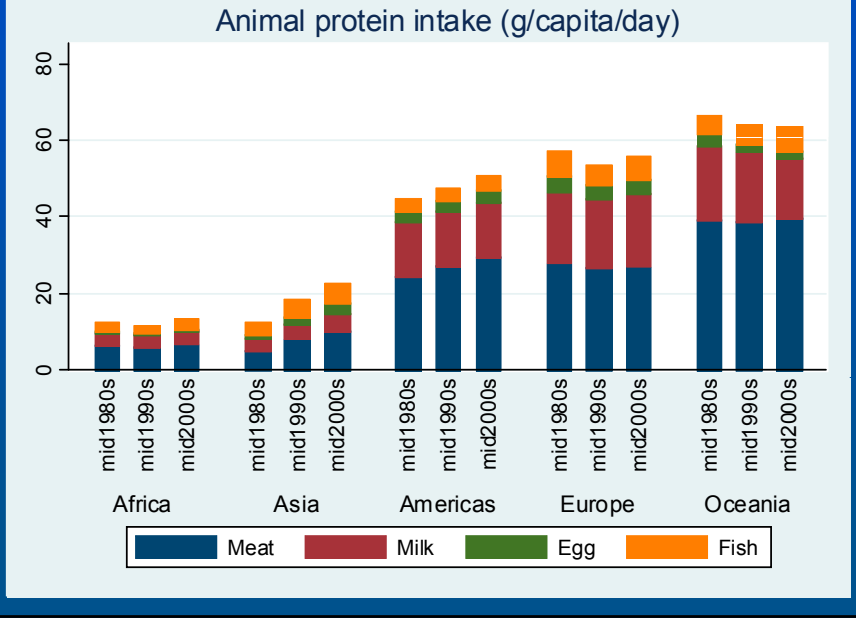
Seafood as poor people's food



Aquaculture's contribution to food security



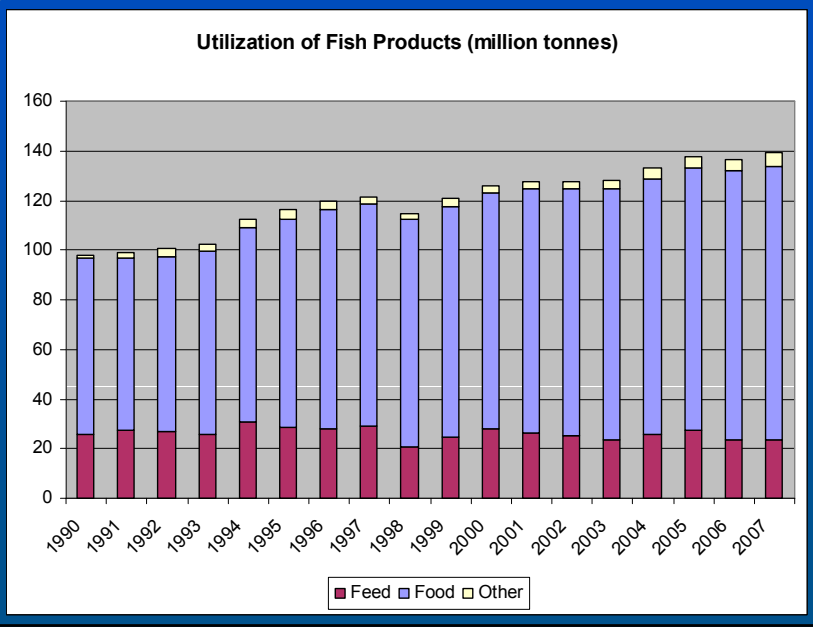
Fish as an animal protein source



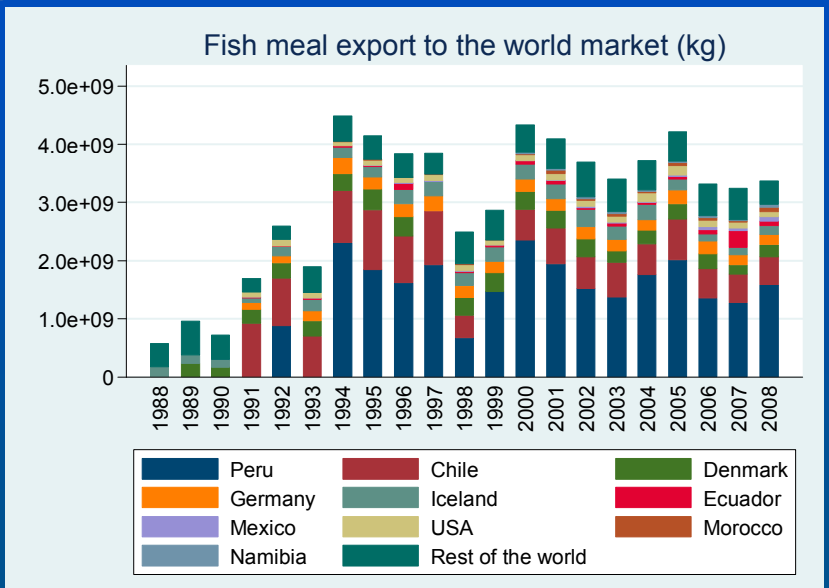
High-trophic species farming and food security

- Biological perspective
  - Use more biomass to produce less
- Economic perspective
  - Provide employment and labor income
    - Positive impacts on food access
  - Feed production driving up the prices of food-grade pelagic species
    - More expensive fish
    - More income
- Policy
  - Regulations restricting use of food-grade species for feed production justified?
  - Can biological efficiency and economic efficiency be reconciled?
- Evidence on negative impacts of high trophic species farming on food security-Not well documented
  - No consumption decrease of pelagic species
  - Micro data may tell a different story

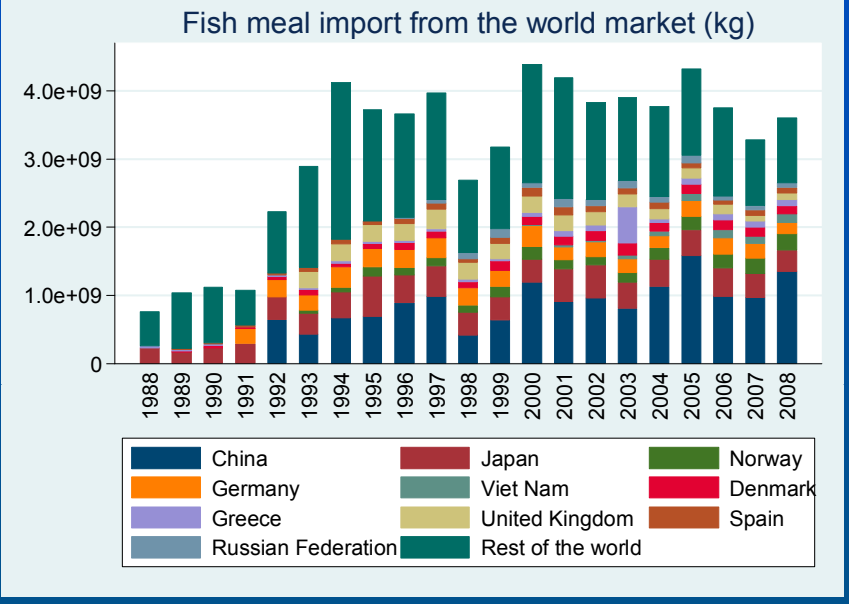
Fish used as feed



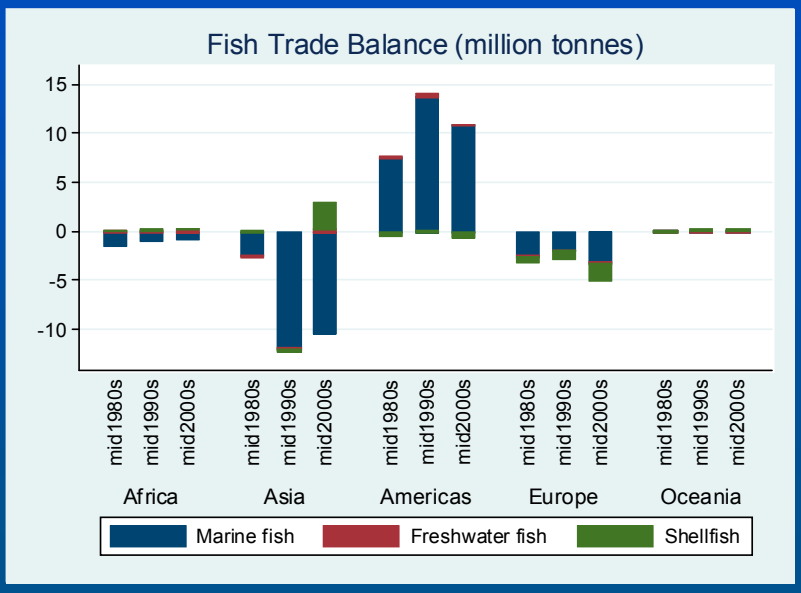
Major fishmeal exporters



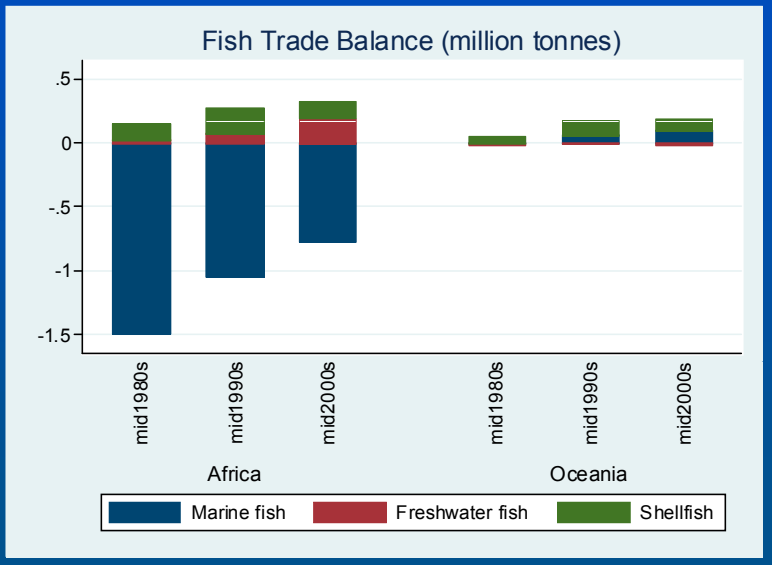
Major fishmeal importers



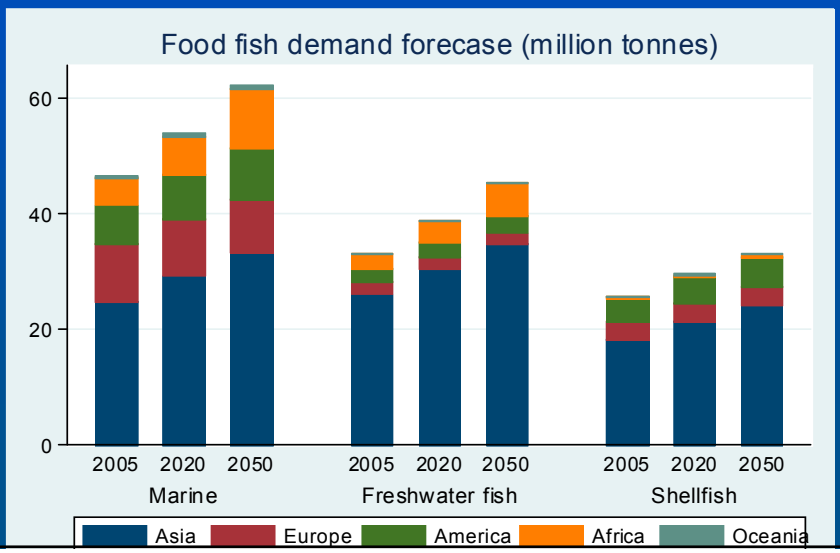
Fish Trade Balance = Fish export – fish import



Fish Trade Balance (Africa and Oceania)



Food fish demand in the future (estimated based on population growth only, not considering economic growth)



Aquaculture's contribution to human health

- Provide high quality protein
- Provide important nutrients
  - Qmega-3 fatty acid
  - Minerals
- Food safety
- Avoid pollution by farming in controlled environment
- Chemical and drugs during farming operations
- Quality of feed ingredient
- Disease
- Aquaculture ponds control disease vectors
- Poorly managed aquaculture can cause water-born diseases
- Professional hazards.

Aquaculture's contribution to knowledge and technology

- Training and extension
- Technology innovations
- Research (disease prevention, artificial breeding, nutrition)

Women empowerment

- Women's participation in aquaculture
  - Seed collection
  - Post-harvest processing
  - Trading
- Constraints faced by women in aquaculture
  - Lack of resources (land)
  - Social attitude
    - Women active in aquaculture in Africa and Asia.
- In general, still gender imbalance (male dominant). There's evidence of aquaculture empowering women.

Community cohesion and social order

- Employment and business opportunities help check out-migration
- Aquaculture may attract immigration, may disrupt community order
- Income inequality: some become rich, some become marginalized, lead to social conflicts
- Export-led aquaculture open the community to the outside world, has repercussion
- Indigenous people's right may not be protected
- Social impacts of aquaculture not well understood

Legal force: Environmental laws and regulations

- Laws and regulations for environmental protection more comprehensive and stringent
  - Site selection, farm size, use of water, feed, chemicals, and wild species, disease control, escapee control, etc
- Lack a comprehensive regulatory framework specifically for aquaculture
  - Only aquaculture-related chapters or clauses under more general fisheries laws
  - Environmental regulations applicable to aquaculture usually established and implemented by diverse agencies
  - Difficulties in monitoring and enforcement tend to make environmental regulations over aquaculture ineffective
- Reactive instead of proactive

Legal force: Environmental impact assessment

- More popular
- Only for new projects, not applying to ongoing operations or addressing existing problems
- Evaluate impacts of individual projects independently, may not account for the aggregate impacts
  - Not effective for the situation where there are many small-scale operations
- Compliance costs
  - Cumbersome for small-scale operations

Market force: Eco-labelling

- Use market force to enforce environmental responsibility
  - More popular
  - Used mostly and widely in developed markets
- Issues
  - Certifying and compliance costs
  - May shut small-scale farmers out the market
  - Being used to gain market power
  - Proliferation of certification schemes
- Research on the impacts of certification on aquaculture lacking

Moral force: Self regulation

- Codes of conduct
  - Many codes of conduct or technical guidelines have been established by international agencies, governments and the industry
  - Fulfillment of these codes hard to monitor
  - Their impacts not well understood
- Farmers association
  - Peer pressure to enforce codes of conduct
- Best or better management practices (BMP)
  - Making environmentally friendly practices economically profitable

Trade barriers: Tariffs and Dumping

- **Tariffs**
  - **Tariffs over seafood products generally low**
  - **Tariffs over processed seafood products subject to relatively high tariffs**
  - **Tariffs for seafood imports in developing countries relatively high**
- **Anti-dumping**
  - **Often used non-tariff trade barriers in seafood trade**
    - **EU and US against salmon (1990s)**
    - **US against shrimp and catfish (2000s)**

Market standards: Public vs. private

- Public safety standards
  - Stringent in developed countries (barrier for small-scale farmers)
- Private standards
  - Pros
    - Public standards insufficient and incompetently implemented.
  - Cons
    - Unjustified, Unnecessary(duplications of safety standards) unfair and uneconomical

Property rights

- Means
  - Licenses, permits, concession, authorization
- Tenure
  - Usually long (more than 10 years) and renewable
- Restrictions
  - Ownership transfer restrained (prevent monopoly)
  - Farm size limited (prevent monopoly)
  - Foreign ownership limited (less than 50%)
- Marine culture in Myanmar as a special case
  - Shorter tenure and less restrictions

Seed production

- Public-private partnership
  - Public hatcheries initially established ;
  - After private hatcheries developed.
- Problems with public hatcheries (as non-profit organizations)
  - Supplying low-priced or poor-quality seed and Corruption.
- Public support for development of private hatcheries (as a better alternative)
- Seed production and trade under stricter public regulations
  - Licensing, certification, ISO standards, etc.
  - For the purposes of maintaining seed supply and quality
  - Sometimes have negative impacts on seed producers' profitability

Feed production

- Feed costs account for a major part of production costs (in intensive operations)
- Shortage of feed ingredients (fishmeal and fish oil)
  - A graph for fish meal and fish oil price
- Regulations over permissible feed ingredients
  - Ecuador: Only residuals from food processing or species not suitable for direct human consumption (concern over food security)
  - Mexico: Fresh crustaceans (except artemias) NOT allowed
  - Chile: Use of animal meat NOT (Concern over food safety)
- Public support over feed production (Asia)
  - Tariff reductions or exemptions on imported feed ingredients
  - Public support to help find other cost-effective feed ingredients
  - Increase the productivity of feed production through promoting large-scale feed mills and encouraging foreign investments

Capital

- ***Capital*** **has been a major bottleneck for aquaculture development**
- **Constraining factors**
  - **Risky nature of aquaculture**
  - **Less understanding of aquaculture and lack of human capital involvement**
- **Public support in Asia**
  - **Encouraging banks to lend to small farms**
  - **Financial support to farmers' cooperatives**
  - **Public-initiated loan programs**
  - **Interest rate subsidies and Tax breaks, etc**
- **Foreign direct investments-** popular way for underdeveloped sectors to overcome financial constraints

Technology and know-how

- Technology and know-how underprovided in the private sector:
  - Farms usually lack resources and incentives to undertake aquaculture research
  - Controversy over the extent of private IPRs (e.g., whether genetic modified organisms (GMO) are allowed to be patented);
  - And the social benefits and costs of private IPRs in aquaculture are generally unclear.
- Proper public-private partnership needed
  - Public-funded research needs to be guided by industry needs.
- Institutions involved
  - Government agencies, fish stations, one-stop Aqua Shop (OAS), international agencies, NGOs, farmers association
- Obstacles
  - Inadequacy of extension messages results lack of assimilation of technical assistance

Pro-poor public policies

- African countries' experience
  - Policies overemphasized on promoting small-scale aquaculture
    - Resulting in an underdeveloped aquaculture sector predominated by government or donor-driven investments as opposed to commercially-oriented private ventures
- Latin American countries' experience
  - Private initiatives backed up by significant institutional support
  - Over intervention ("duplication of effort") and over regulation ("excess of rules and powers")
- Asian countries' experiences
  - Commercial aquaculture (the "transition pathway" and the "consolidation pathway") more effective for poverty alleviation
- Lessons learned:
  - Pro-poor public policies should enable the poor participation in aquaculture business
  - Governments and international agencies should create an enabling business environment through capacity building, technology innovations and other public goods that tend to be underprovided by the private sector.

Non-government organizations (NGOs)

- NGOs' contributions to aquaculture development
  - Providing training and extension services
  - Facilitating research and technological innovations
  - Developing standards and codes of conduct, organizing farmers
  - Promoting BMPs
  - Participating in public policy decision making,
  - Monitoring public programs and private businesses,
  - Educating consumers and increasing public awareness
- NGOs become more powerful
  - Certification to gain consumers' support
  - Companies more willing to cooperate with NGOs
- More power means more responsibility

Community-based aquaculture

- Community or cluster-based aquaculture help farmers
  - Gain access to markets, credits and technologies
  - Share experiences, information and risks
  - Enforce codes of conduct
  - Promote BMPs
  - Increase bargaining power
  - Enhance community cohesion
- Community-based aquaculture has mainly been a tool used by donors and
- NGOs to promote pro-poor aquaculture
  - Can it become a self-sustained institutional arrangement for facilitating socially responsible aquaculture?
  - How community-based aquaculture can help develop social capital?
  - How public policies and NGOs can facilitate this process?

Co-management

- Command and control measures not likely to result in socially acceptable aquaculture development
  - Complex socio-economic impacts involve many tradeoffs
- Co-management
  - A decentralized decision-making process intended to share rights and duties among all stakeholders
  - Increasingly popularity in aquaculture management
- Examples of co-management
  - NGO's involvement in decision-making process
  - Partnership between producers associations and scientific communities
  - Partnership between NGOs and the industry
  - Partnership among individual fish farmers
- How can co-management become mainstream?

The way forward

- Challenges
  - More stringent environment protection requirements
  - Higher food safety standards
  - Lack of aquaculture sites, freshwater and other natural resources
  - Shortage of feed
  - Increasing energy prices
- Improvements in institutions
  - Enabling public policies
  - More efficient regulatory framework
  - Better partnership among stakeholders