



Global Conference on Aquaculture 2010

Farming the waters for People and Food

22-25 September 2010, Phuket, Thailand

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Why are we gathered here?

- Farming of the waters
 - Significant food production sector
 - Provide many of millions of livelihood opportunities
 - Contributes to: **food security, nutrition, poverty alleviation**
 - Has a very long history
 - Thought to originate in China
 - But new evidence (?) suggests south-west Victoria, Australia: Farming of eels by the aboriginal communities
 - Need to be revisited?



- We are here to:
 - Take stock of the last decade
 - Evaluate how the sector could sustain in the next decade
 - Ascertain how the sector could contribute to the **Millennium Development Goals**






Millennium Development Goals 2015

1 ERADICATE EXTREME POVERTY AND HUNGER	2 ACHIEVE UNIVERSAL PRIMARY EDUCATION	3 PROMOTE GENDER EQUALITY AND EMPOWER WOMEN	4 REDUCE CHILD MORTALITY
5 IMPROVE MATERNAL HEALTH	6 COMBAT HIV/AIDS, MALARIA AND OTHER DISEASES	7 ENSURE ENVIRONMENTAL SUSTAINABILITY	8 BUILD GLOBAL PARTNERSHIPS FOR DEVELOPMENT


2015

- Reduce by half the proportion of people living on less than a dollar a day
- Achieve full and productive employment and decent work for all, including women and young people
- Reduce by half the proportion of people who suffer from hunger



The task ahead of me

- To impress upon the importance of aquaculture to the Asia-Pacific (A-P) region
 - Its form and function
 - Its long-term sustainability
 - Its contribution to
 - Food fish production
 - Nutrition of the rural poor
 - Rural livelihoods
 - Income generation
 - Food security


Consumption & Needs

- Fish consumption has been on the rise
 - A-P accounts for nearly 70% of global consumption
- Per caput
 - A-P: 43 kg/year
 - Global: 22 kg/year



- Fish are consumed in many forms in the A-P

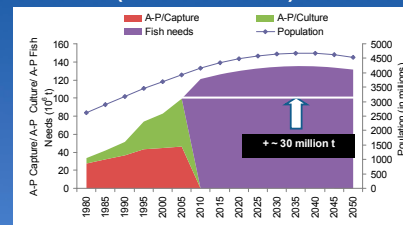
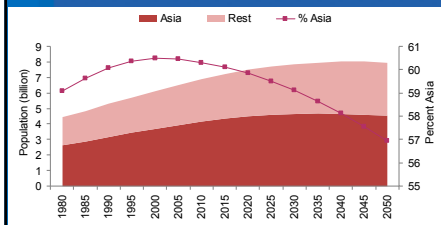


Future Food Fish Needs

- Region population
 - Year 2050: 6.533×10^9
 - Proportion of global population: decline
 - Based on current consumption (29 kg/caput/yr)
 - By 2050: An extra 30 million tonnes needed
 - Where does this “need” come from?



(Economist, Nov. 2009)



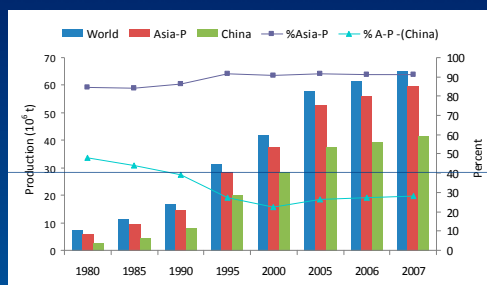
The past decade

- A-P dominated aquaculture globally
 - Accounts for 90% of global production

Year	Global (t)	A-P (t)
1987	13,961,611	11,939,706 (85.5%)
1997	34,261,739	31,075,412 (90.7%)
2007	65,190,029	59,568,049 (91.4%)



- PR China is the mainstay in the region
 - Without PR China region's contribution only 30%



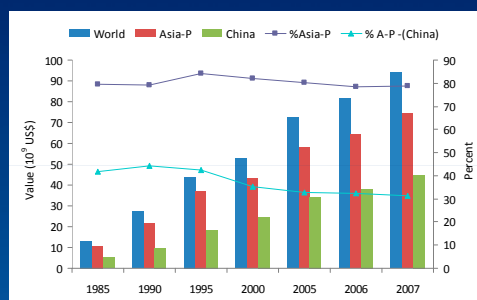
Shrimp culture/green-house conditions; enables 2.5 crops/yr



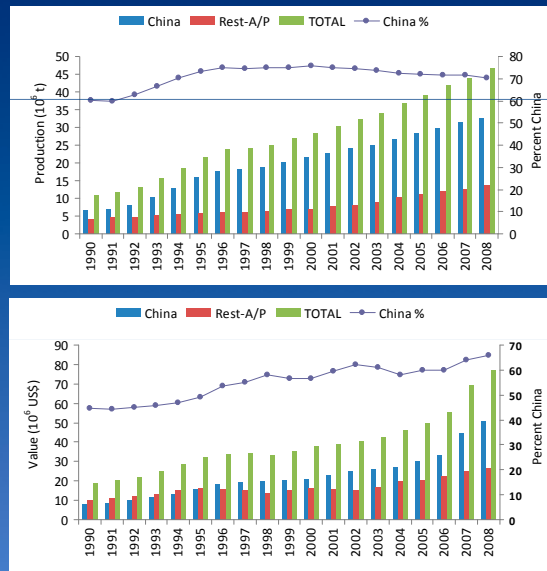
Backyard hatcheries for many species-Hainan is



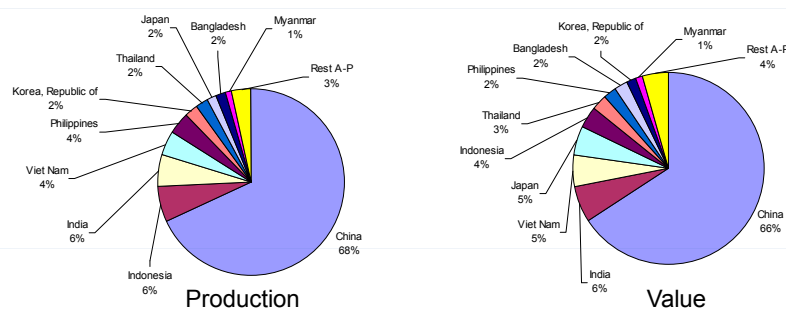
- Value of produce
 - Almost mirror image of production trend
 - Overall, accounts for about 80% value of global aquaculture
 - China is the main contributor
 - The rest accounts for 30% of value of culture



The dominance of PR China

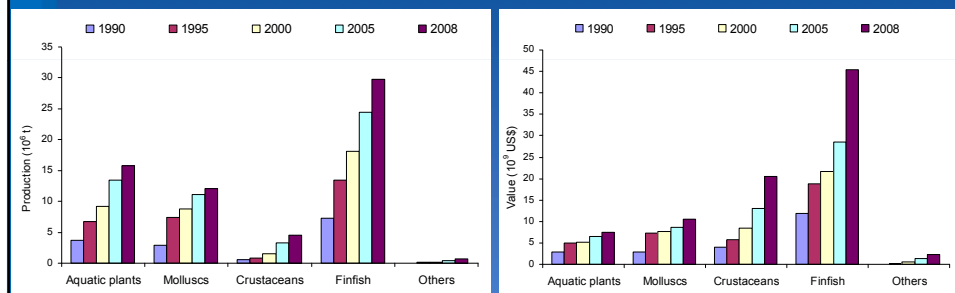


Country contribution in 2008



Commodities

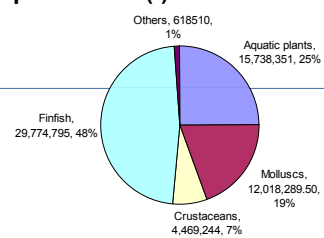
- Finfish dominance
- Crustaceans least
 - But 2nd ranked in value
- Aquatic plants
 - 2nd ranked in volume but least in value



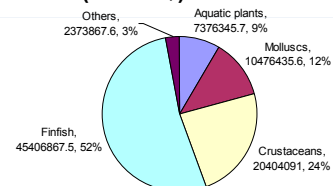
- Crustacean
 - volume only 7%, but value 24%
- Finfish
 - volume 49%
 - Value 55%
- Aquatic plants
 - Volume 22%
 - Value 8%



2008 production (t)



2008 value (10³ US\$)



Unit price

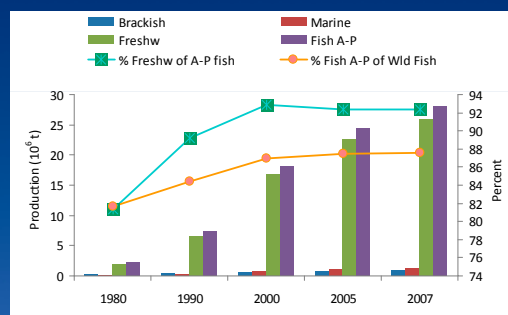
- Almost all commodities in A-P unit prices comparable
- Significant difference between crustaceans and others
- Unit price (farm gate) has declined/ remained static
 - Biggest change in crustaceans
 - Should this be so?
 - Does this trend match for other food commodities
 - If not, WHY?



But where and for who benefits most?

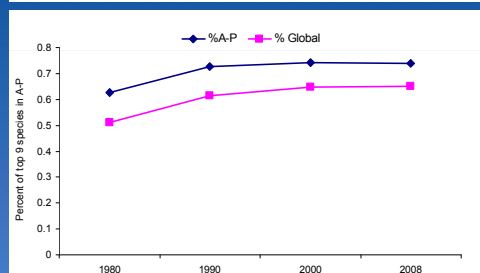
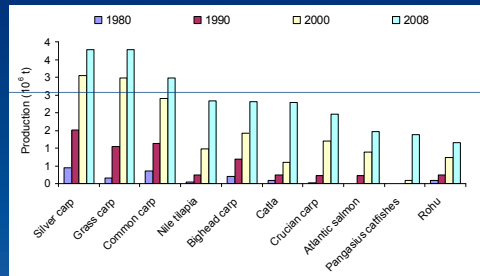
Relation to environment

- Predominantly
 - finfish
 - freshwater fish

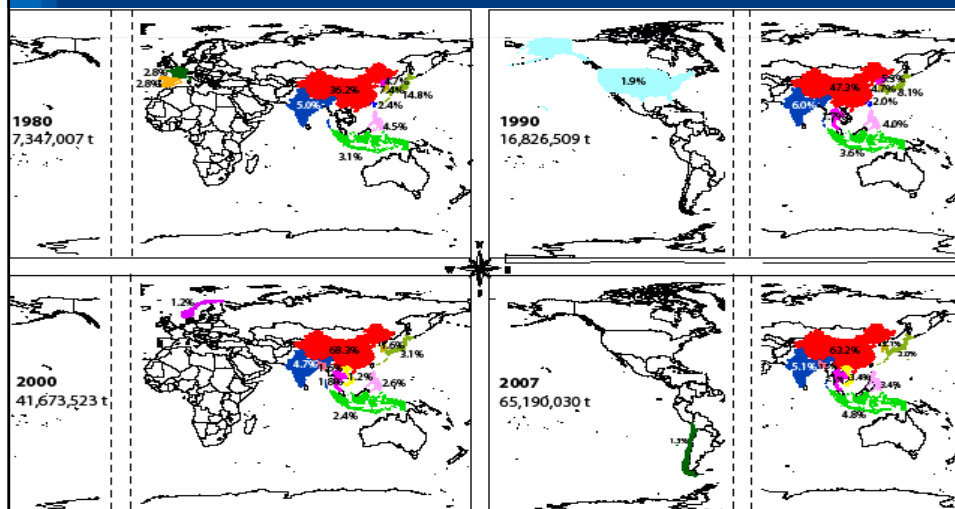


Cultured species: Top 10 globally

- Only one temperate species in the rank
- Seven cyprinids among the top 10
 - Feeding low in the trophic chain
- Contribute nearly:
 - 75% to production in the A-P
 - 65% to global fish

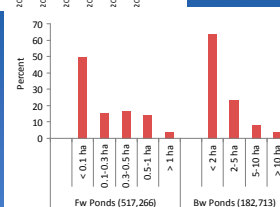
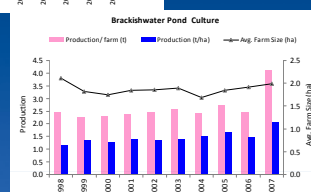
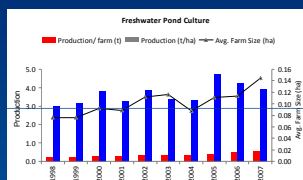


The dominance of A-P countries over the years



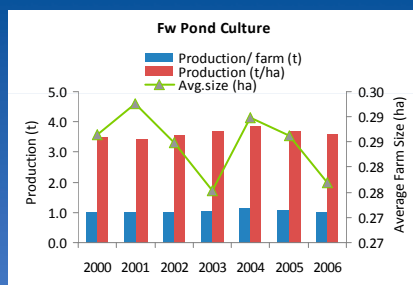
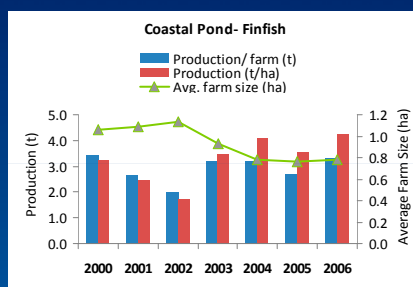
Lesser known entities: Farm size

- A-P aquaculture is small-scale
 - Farmer owned/leased, managed and operated
- Examples
 - Indonesia
 - Freshwater ponds: 0.14 ha
 - Increase in area and productivity



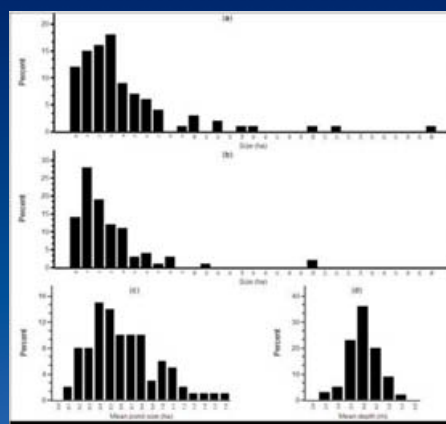
– Thailand

- Coastal pond: 0.8 ha
- Freshwater pond: 0.28 ha



– Vietnam catfish culture

- >55% under 4 ha
- But production per ha very high, average 350-400 t/ha/crop
- Still the great bulk are farmers own, manage and operate



Take home message (?)

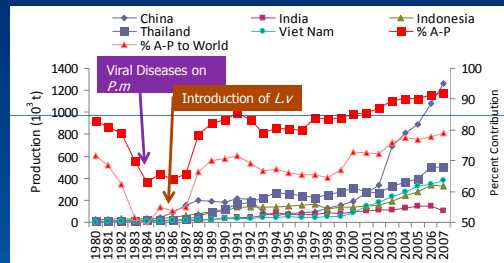
- Great bulk small, farmers owned, managed and operated
- No difference to the rest of the primary production sectors in the A-P
 - Rice:
 - E.g. China – world biggest rice producer
 - 182.04×10^6 t (2006); 29% global production
 - Avg. farm size 0.93 ha/farm
 - Dairy (RAP, 2008)
 - E.g. India – highest global producer
 - 210×10^6 cows and buffaloes
 - But owned by 70×10^6 households
- Aquaculture in Asia will remain small-scale
 - Development strategies have to “factor” this in



Notable developments

• Shrimp

- Farmed shrimp to 70% of shrimp sold on world markets in 2006
- Average annual growth in crustacean
 - 1970-1990: 24%
 - 1990-2000: 9%
 - 2000-2006: 16%
 - 1970-2006: 18%
- Predominant production
 - A-P
 - *Penaeus monodon*
- Major disease outbreaks in 1980 and beyond
- Needed strategies to
 - Maintain the sector
 - Generate income
 - Provide livelihoods



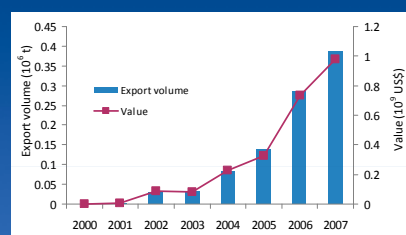
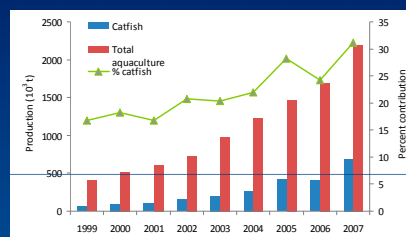
• Shift to *L. vannamei*

- In some nations
- Paid off:
 - Production increased
 - Livelihoods safeguarded
 - Income generation continued
- Lesson learnt
 - Resilience of farmers
 - Adaptability
- Is the sector sustained?



• Striped catfish/Vietnam

- Possibly the fastest growth in any sector, globally, ever
- Total area of farming (<7,000 ha)
 - 2007: $683 \cdot 10^3$ t ($645 \cdot 10^6$ US\$)
 - 2008: $835 \cdot 10^3$ t ($800 \cdot 10^6$ US\$, 1st seven months)
 - The fastest growth for any aquaculture sector, in a nation, in a small area
 - Over 200,000 employed
 - Bulk are women



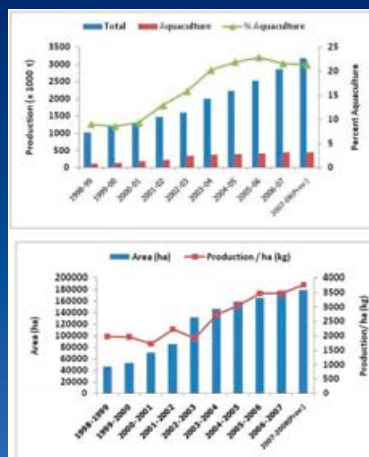
• Striped catfish (cont.)

- Perhaps most importantly:
 - Highest production per unit area for any primary production sector
- The sector has combated successfully, major marketing obstacles
 - E.g. US embargo on Vietnam catfish imports to USA
- Put in perspectives
 - Catfish culture in ~7,000 ha produces as much as 67% of all European aquaculture production



• Rohu culture in Myanmar

- *Labeo rohita*: widely cultured in the region
- Myanmar:
 - Developed a “niche” export market
 - 5-6 yr span (>US\$ 90 million)
 - Triggered
 - Production
 - Employment
 - » Processing sector >100,000 women
 - Niche markets for commodities that were considered “unexportable”



• Development and adoption of BMPs

- BMPs were developed as a consequence to solve disease problems in shrimp farming in India
- First step:
 - “International Principles for Responsible Shrimp Farming”
 - A consortium approach
 - World Bank Green Award 2006
- Carried further now
 - Shrimp farming
 - Striped catfish
- BMPs:
 - Ensure sustainability and higher production
 - Increase competitiveness of small scale producers
 - Ensure food quality and safety
 - Facilitate market accessibility to small scale farmers
 - Facilitates environmental integrity
 - Increase harmony among farmers



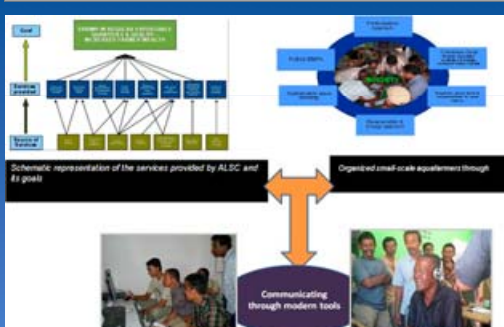
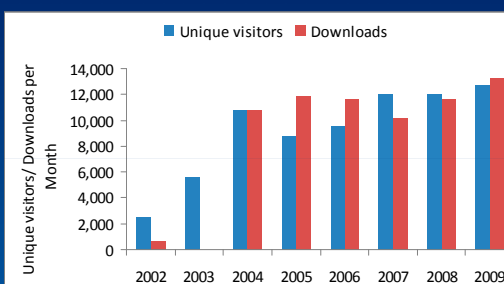
• Cluster approach and BMPs

- Adoption of BMP in shrimp farming in India
 - Significant results
 - Policy and governance changes
 - Establishment of NaSCA
- Farmers in a cluster act as a unit
 - Increased income
 - Higher bargaining power
 - Quality produce
 - Self policing system in place
 - Enable to access niche markets
 - Enable to obtain "cluster certification"
- Soon a regional strategy for important commodities
 - E.g. catfish in the Mekong Delta
- Gateway to food security/quality
- Complying with mushrooming standards



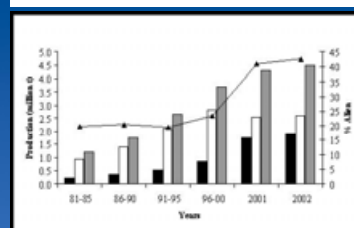
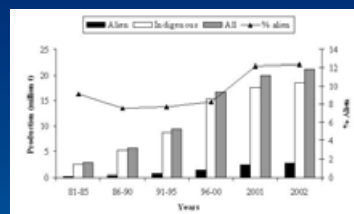
• Preparing the small scale farmer to meet modern day challenges

- Increasing use of web-based information by farming community
- Bringing rural farmers to use modern ICT
 - Obtain advice on day to day problems
 - Market information
 - Coordinating cluster activities
 - Harvesting
 - Operation of crop-calendars

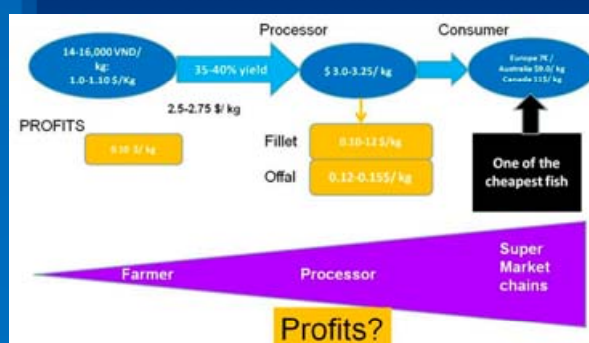


Issues relating to biodiversity

- All development should minimise impacts on biodiversity
- Aquaculture
 - Alleged too much dependence on alien species
 - Fact or fiction?
 - **Fact:** Alien species play a major role in A-P aquaculture
 - **Fiction:** Probably no explicit evidence from the A-P region



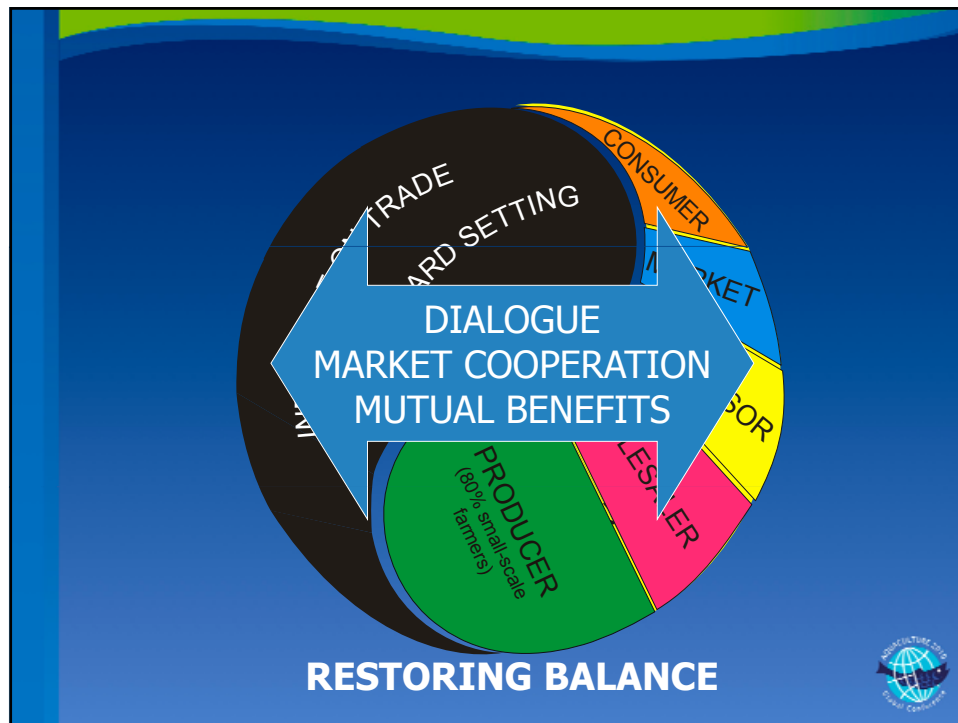
Major challenges encountering the sector: An example of market forces



>> In the first five months of 2010, the gross output was 248,834 tons with a value of USD 533 million, respectively increasing 19.4% and 11.6% in comparison with the same period of 2009. The increasing value is not equal to the increasing output due to the decrease in average fish price from 2.28 USD/kg in 2009 to 2.13 USD/kg.

>> In Soc Trang, Tra fish farming area of Ke Sach District remains 90 ha (Formerly 114ha). Tra fish stocking area in Can Tho is about 420 ha, decreasing by 60% in comparison with the same period last year. In Tra Vinh Province, the area for stocking and farming is only approximately 30 ha. Dong Thap has just 1,100 ha for stocking and farming, decreasing by 700 ha in comparison with 2009. In other provinces, "suspended pond" areas are also 40-50%.

Economic viability at stake?



Unfounded negative publicity

- 3. Pangas are not environmentally sustainable, a most unsustainable food you could possibly eat** - 'Buy local' means creating the least amount of environmental harm as possible.....
- 4. There's nothing natural about Pangas** - They're fed dead fish remnants and bones, dried and ground into a flour, from South America, manioc (cassava) and residue from soy and grains.....
- 5. Pangas are Injected with Hormones Derived from Urine** - I don't know how someone came up with this one out but they've discovered that if they inject female Pangas with hormones made from the dehydrated urine of pregnant women.....but just consider the rest of the reasons to NOT eat it..
- 6. You get what you pay for** - and then some. Don't be lured in by insanely cheap price of Pangas. Is it worth risking your health and the health of your family?
- 7. Buying Pangas supports unscrupulous, greedy evil corporations and food conglomerates** that don't care about the health and well-being of human beings.....
- 8. Pangas will make you sick** - If (for reasons in #1 above) you don't get immediately ill with vomiting, diarrhea and effects from severe food poisoning, congratulations, you have an iron stomach! But you're still ingesting *POISON* not *poisson*.

Final important note: Because of the prodigious amount of availability of Pangas, ^{****}..... or eating out at cafes / food stalls by choosing fish-&-chips, think twice !!

You have been warned !!!

Are any of the above valid?
Definitely not!!

AGRICULTURE

Climate change impacts

- A-P aquaculture spread from 43°S to 43°N
 - Major activities 23°S to 23°N
- Major impacts
 - Deltaic areas – hubs of activities
 - Mekong Delta, Ganges, Brahmaputra
 - Sea level rise
 - Reduced water flows
 - Tidal/wave surges
 - Extreme climatic events
 - Need to develop suitable strategies/mitigating measures



Counteracting erroneous public perceptions

- Aquaculture in the forefront in the past three decades
- An era of communication technology
 - Increased public awareness and aspirations
- Subjected to “more public policing”
- Public perceptions:
 - Impacts on policy
 - Development
- Aquaculture
 - Many erroneous public perceptions
 - Need to counteract these
 - Positives have to be highlighted
 - Profile enhanced
- How?
 - Later



(Time, April 2009)

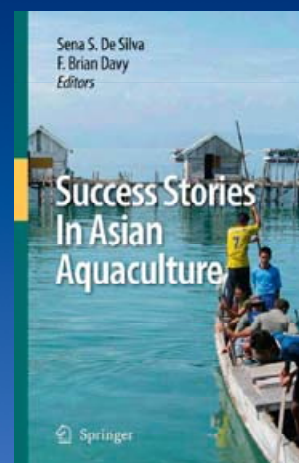


Way forward...



Establishing a conducive climate for development

- Improve public perception on aquaculture
 - Conducive policy developments
- Increase the profile of aquaculture
 - As a food source
 - Income generator
 - Contribute to food security
 - As an effective secondary user of water
 - Minimal environmental perturbation
 - Publicise positive impacts on biodiversity
- How?
 - Develop and publicise “Success Stories”



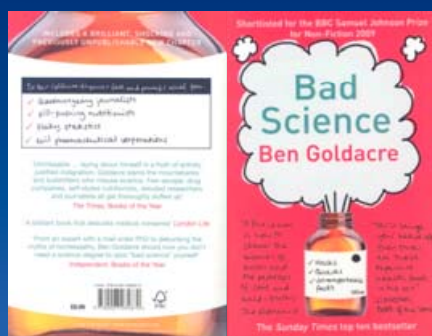
Increase in production, profitability and economic viability

- Encourage development and adoption of science-based BMP
 - Associated with a cluster approach
- BMPs
 - Empower small-scale farmers
 - Empower farming communities
 - Improve production
 - Reduce disease occurrence
 - Increase production
 - Increase profitability
 - Reduce environmental impacts
 - Care for common property resources sharing
 - Improve access to
 - Market
 - Credit
 - Government



Furthering communication & small-scale farmer education

- Small scale farming
 - Narrow profitability
- Often induced to use
 - Untested, unproven efficacies
 - Probiotics (indiscriminately)
 - Therapeutants, feed additives etc.
- Comparable to what is recommended for humans
- Flog technologies
 - Relevant or not
 - Needed or not
 - Proven or not
- Evidence that farmers could save up to 20% of recurrent costs
- Interactions between farmer groups
 - Intra- and inter-countries
 - Learn from each other



Book on Debunking
aquaculture
nonsense?



New developments: Culture-based fisheries

- A-P region
 - 66,710,502 ha of small, non-perennial water bodies (FAO, 1999)
 - Only <5% used for fish production
- Culture-based fisheries (CBF)
 - A secondary use of water (non-consumptive)
 - On seed stocks as external input
 - Environmentally non-degradable
 - Very little capital inputs
 - Attractive to governments
- CBF increase
 - Income
 - Food fish
 - Communal harmony

Potential production of 8 to 10 million tonnes of fish by 2015



New developments: Use of large, static water bodies for cage culture

- Large resource in Asia
 - Very ancient
 - >2,000 years old
 - Linked to rice cultivation
 - Centres of civilisation
 - Modern age
 - E.g. China 86,000 since 1948!
 - Asia – highest impoundment rate
 - Controversies linger on
 - E.g. Mekong mainstream damming



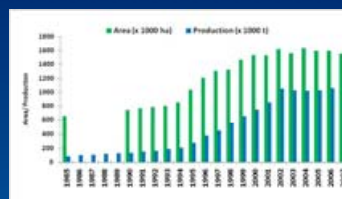
Changes in reservoir numbers and volume (>0.1 km³) in Asia, together with the volume of such reservoirs in Asia as a percentage of that in the world (based on data from Akiyoshi & Ishiwata, 1998)

- In some intensive cage culture
 - Alternative livelihood to “displaced persons”
- The cage culture potential in Asian reservoirs not adequately exploited
 - Exception: Indonesia
 - Ciratum watershed
 - 3 reservoirs (~20,000 ha)
 - $60\text{--}80 \times 10^3$ t/yr
 - ~3,000 kg/ha/yr
 - Local, stable market
- Development not without problems
 - Not insurmountable



Improvements to rice-fish culture

- A-P region
 - 137.5×10^6 ha of rice
 - 90% of world area of rice cultivation
- PR China
 - Rice-fish traditional
 - New improvements
 - Production increased
 - Marketable
 - Farmer livelihoods/income improved by 4-5 fold
 - 2.3×10^6 rural households impacted
 - High possibility of adoption through the region
 - Bangladesh – already moving forward

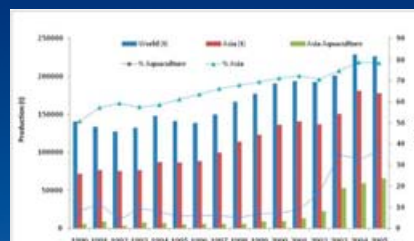


(Source: Weimin 2009)



Expansion of mariculture

- Fastest growing sub-sector
 - Groupers, wrasses
- Caters to lucrative markets
 - Live food fish restaurant trade
 - Growing trade
- Increasing dependence on hatchery produced seed stocks
 - E.g. mouse grouper
 - Many others developed
 - To be commercialised
- Decreased dependence on wild caught fish
 - Lesser use of destructive gears
 - Fragile habitat preservation
- ++ impacts on biodiversity



Application of technologies

- Genetic improvement in major cultured commodities
- Science-based broodstock management
 - Maintain and improve genetic quality of broodstock
 - Minimise negative impacts on local populations
- Molecular screening for diseases
- New strains to combat climate change impacts
 - E.g. salinity tolerance catfish for the Mekong Delta



- Adapting SPF technology
 - Revival of *P. monodon*
 - For backyard, small-scale hatcheries
 - Simple construction
 - Low cost
 - Resilient
 - Adaptable
 - Diversity possible
 - Added income
 - Easily transferred technology
 - Independence from multi-nationals
 - Thailand already taken a lead

5th Generation SPF b-stock

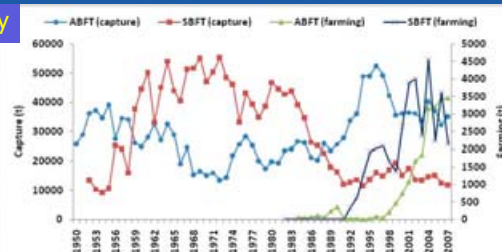
Contribution to conserving stocks and providing food sources



Advertisement - for one regional edition would cost around US\$150,000

- True?
- Exaggerated?
- Over dramatized?
- Effective?

Reality



- Same magazine selects 50/year
 - Scientific
 - Global impacts (potential)
 - Socially
 - Economically
- For 2009, ranked 2nd innovation

TANK BRED TUNA
Regional innovation
- Oz

