



# Global Conference on Aquaculture 2010

Farming the waters for People and Food

22-25 September 2010, Phuket, Thailand

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3. Presented at the Global Conference on Aquaculture 22-25 September 2010, Phuket, Thailand.



## Global Conference on Aquaculture 2010

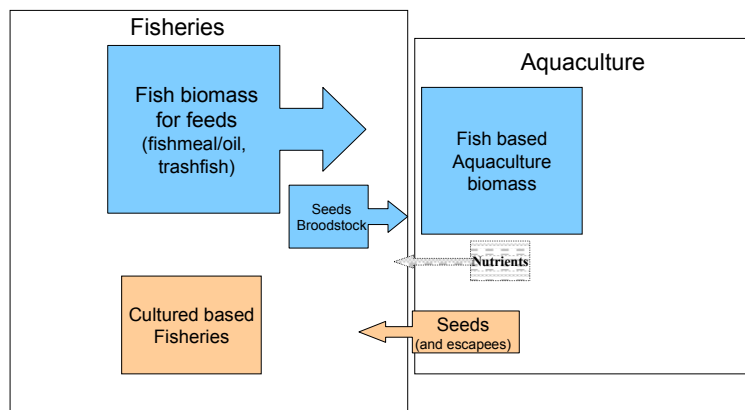
### Expert Panel Presentation III.2: Addressing aquaculture-fisheries interactions through the implementation of the ecosystem approach to aquaculture (EAA)

By Doris Soto, Patrick White,  
Tim Dempster, Sena De Silva, Alejandro Flores, Yannis Karakassis, Gunnar Knapp, Javier Martinez, Weimin Miao, Yvonne Sadovy de Mitcheson, Eva Thorstad, Ronald Wiefels

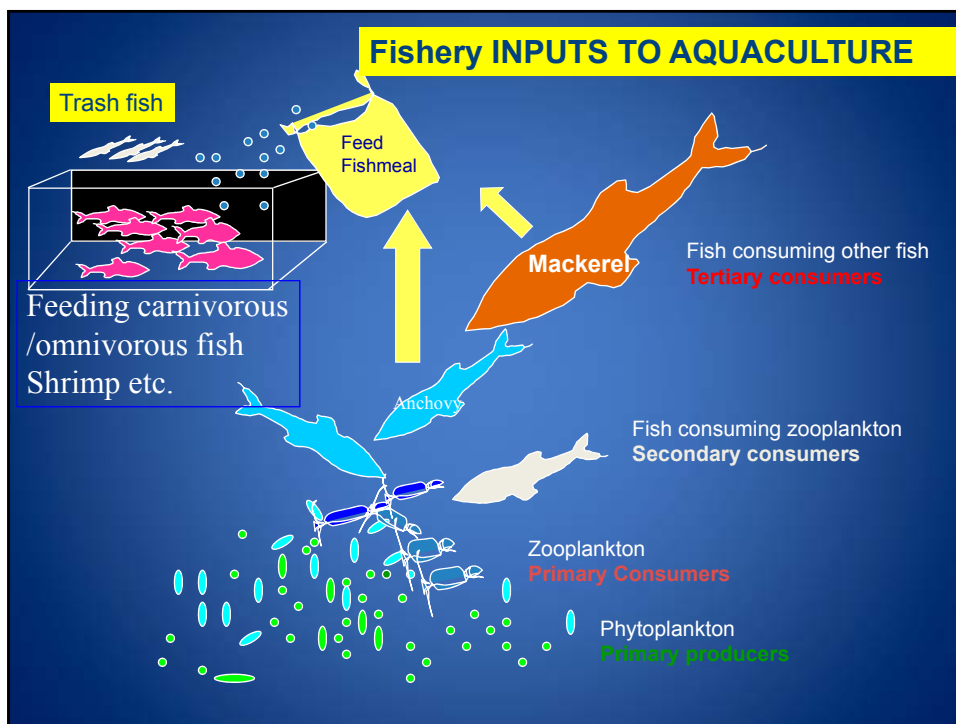
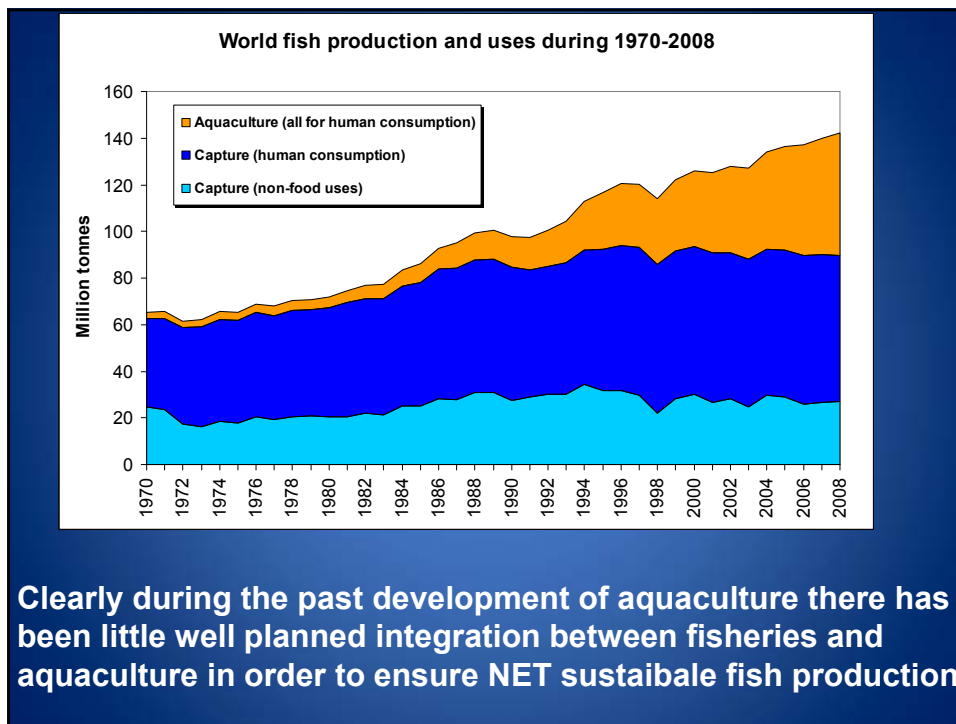
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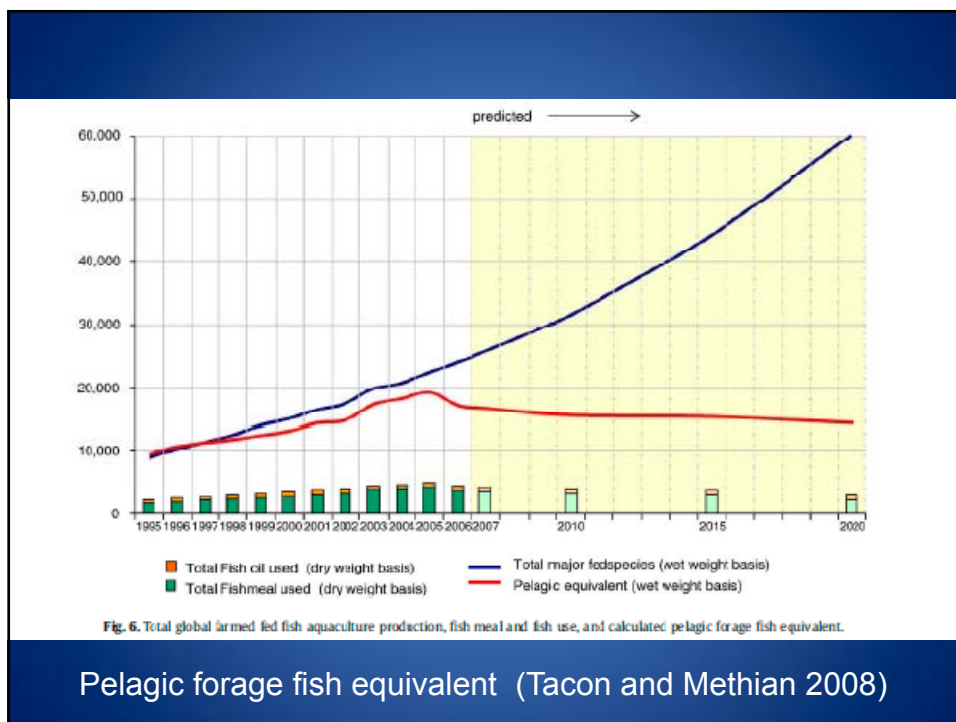
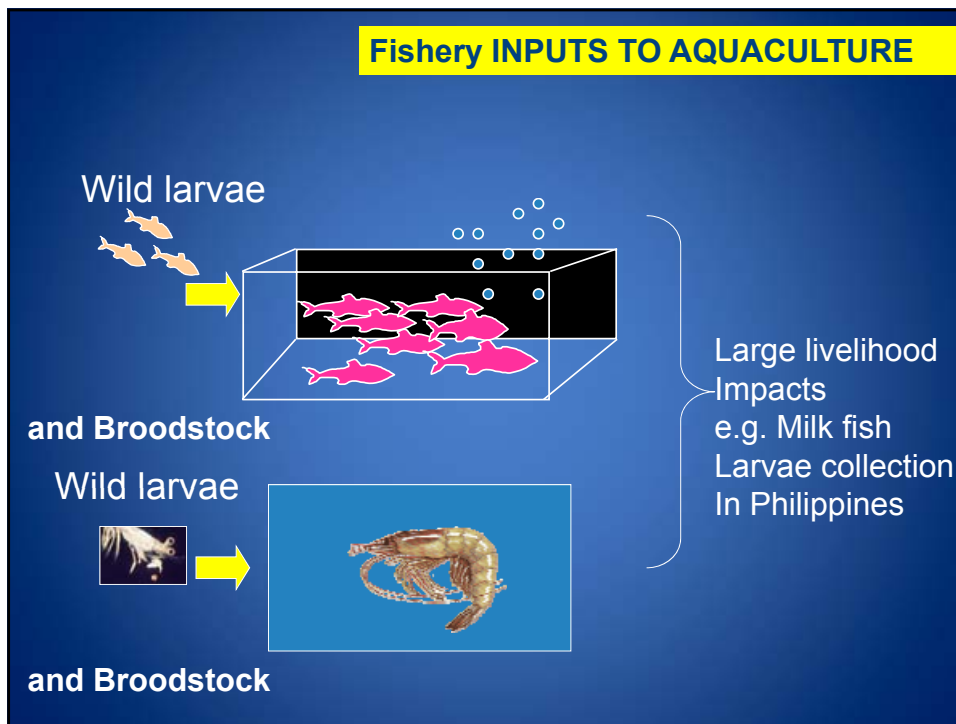


## Most relevant biophysical interactions



## Socioeconomic interactions





# Aquaculture products

## Impacts on fisheries

### Biomass



•Potential release of local fishing pressure due to alternative alternative livelihoods



•Potential negative impact on Fisheries due to competition for common Markets (lowering of prices)

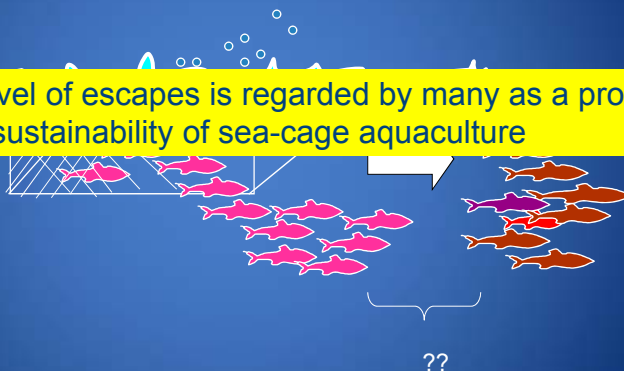


•Facilitation of processing and markets and marketing

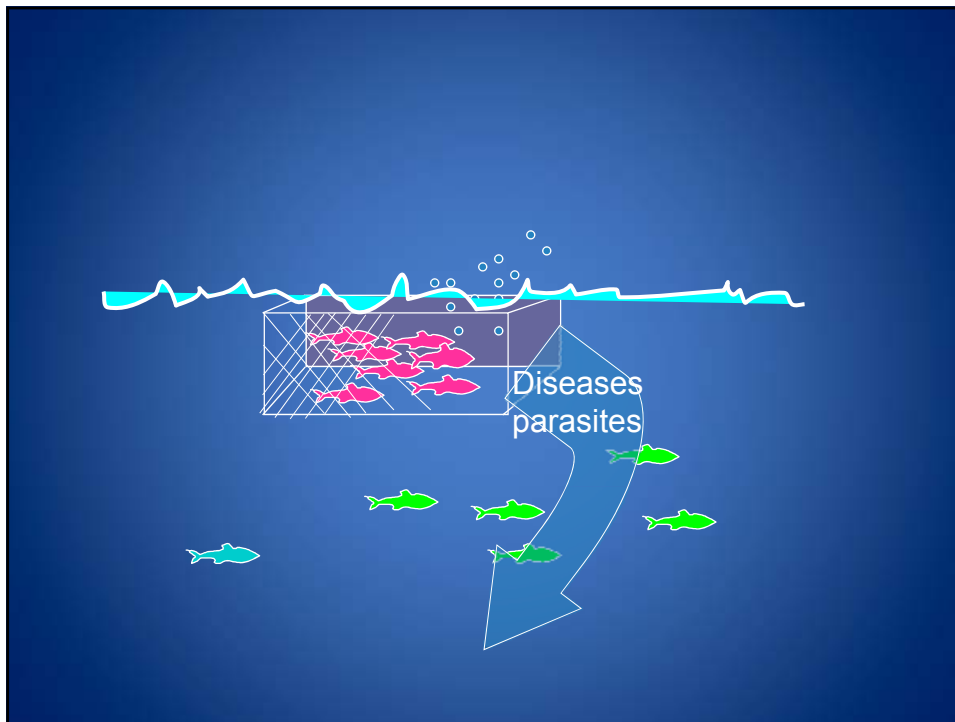


## Impacts from escapes; both native and exotic species

The present level of escapes is regarded by many as a problem for the future sustainability of sea-cage aquaculture



**Stocking and population enhancement;  
Culture Based Fisheries**



## Information available regarding escapes

- Mainly for salmon where is native and where is exotic (e.g. Atlantic salmon in Norway vs Chile)
  - There is a public concern regarding local fisheries
- Do we know enough about ..e.g. Tilapia, Catfish escapes?,??
  - Less public concern on potential impacts?, more emphasis on socioeconomic bennefits?

**Incidence and impacts of escaped farmed Atlantic salmon *Salmo salar* in nature**

Eva S. Thorstad, Ian A. Fleming, Pålbjørn McGinnity, Dáire Soto, Vidar Wamsvik & Fred Whoriskey

Report from the Technical Working Group on Escapes of the Salmon Aquaculture Dialogue

**Causes of escaped farmed salmonids 2001 - 2006**

Cause	Percentage
Farm failure	52%
Collision	13%
Other	12%
Predators	5%
Failure in smolt farm	5%
Floatsam	5%
Propeller damage	5%
Handling	3%
Towing	0%

## Diverse impacts in different situations

**Chile**

Year	Production (tons x 10 <sup>3</sup> )	Escaped Salmon (N° x 10 <sup>3</sup> )
93	~100	~50
94	~200	~1700
95	~300	~1500
96	~400	~500
97	~500	~600
98	~600	~900
99	~700	~1000
00	~800	~1100
01	~900	~1200
02	~1000	~1300
03	~1100	~1400
04	~1200	~1500
05	~1300	~1600

**Norway**

Year	Reported number of escaped farmed salmon
1993	~500,000
1994	~550,000
1995	~250,000
1996	~450,000
1997	~500,000
1998	~550,000
1999	~350,000
2000	~280,000
2001	~280,000
2002	~420,000
2003	~380,000
2004	~550,000
2005	~700,000

**Figure 2.2.** Reported loss of Atlantic salmon from fish farms in Norway through escapes/leakages during 1993-2005. Source: Statistics Norway ([www.ssb.no](http://www.ssb.no)).

## Hatchery larvae for stocking

Seeding of *P vanamei* in  
The Gulf of Fonseca  
Centro America



### Potential impacts on fisheries

• Potential for recovering  
of wild stocks with a positive  
effect on fisheries

+

• Ecosystem risks????

-

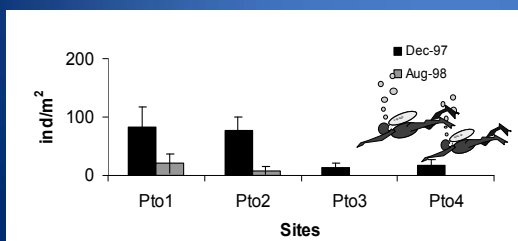
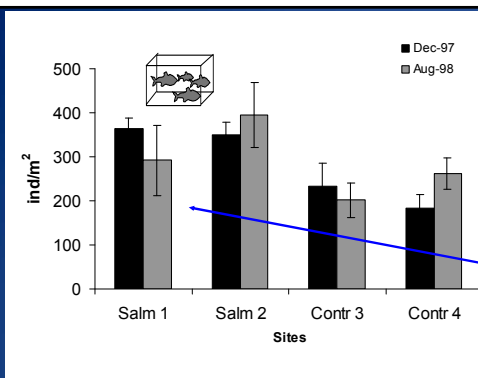
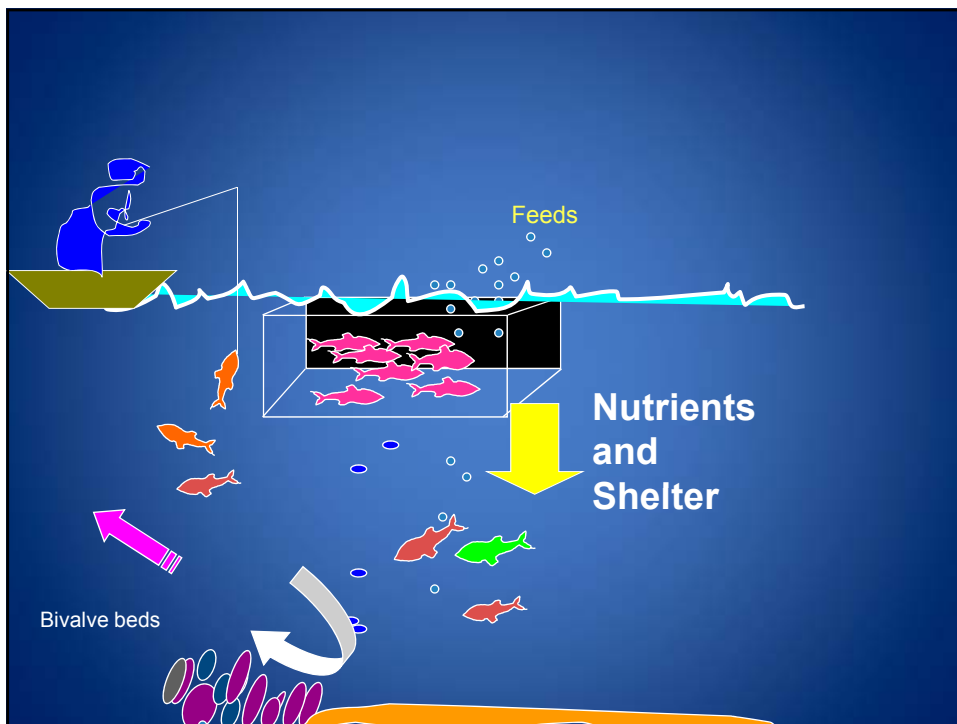
## Cultured based fisheries

- Establishment of new fisheries in newly built reservoirs;
- re-stocking of over-fished natural or artificial water bodies for subsistence and livelihoods,
- conservation and improvement of certain fisheries through enhancement of over fished stocks,
- rebuilding of endangered species stocks

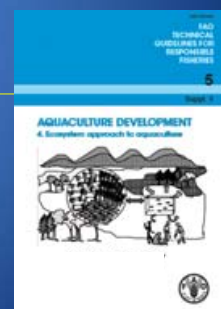
## Culture based fisheries.....

- Highly relevant for food security and livelihoods; already being practiced in many continents but specially in Asia (China, Lao, Vietnam, Sri Lanka )
- The contributions of CBF programs in Latin America, Europe and Africa are still comparatively small, but relevant (e.g. Mexico) it is foreseen that these will play an increasingly relevant role in the short run

- **Great potential to increase fisheries yields and outputs if.. adverse effects can be minimized**
- Stocking and CBF (and escapes) may affect wild populations through the transmission of diseases, increased competition and predation, and genetic interactions



- “An **Ecosystem Approach for Aquaculture** is a strategy for the integration of the activity within the wider ecosystem such that it promotes sustainable development, equity, and resilience of interlinked social-ecological systems”.



The EAA is guided by three main principles:

1. **Aquaculture should be developed in the context of ecosystem functions and services (including biodiversity) with no degradation of these beyond their resilience**
2. **Aquaculture should improve human-well being and equity for all relevant stakeholders.**
3. **Aquaculture should be developed in the context of other sectors, policies and goals.**

## Scales relevant for the implementation of EAA

- **Farm**
  - Easy to define, sometimes easy to regulate, to control and to monitor
- **Watershed/aquaculture zone**
  - A major problem with the implementation of EAA at this scale is that often they do not coincide with administrative and even national scales. Yet management is often necessary at this scale
- **Global**
  - This level requires global partnerships and agreements

## EAA Spatial Scales

The farm



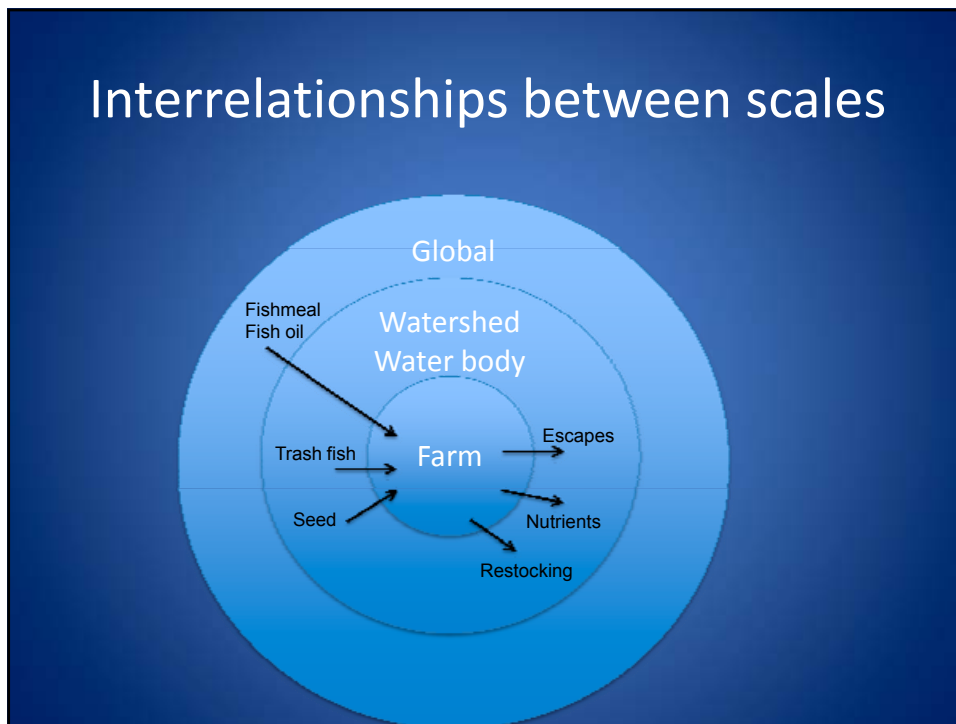
The waterbody and its watershed/aquaculture zone



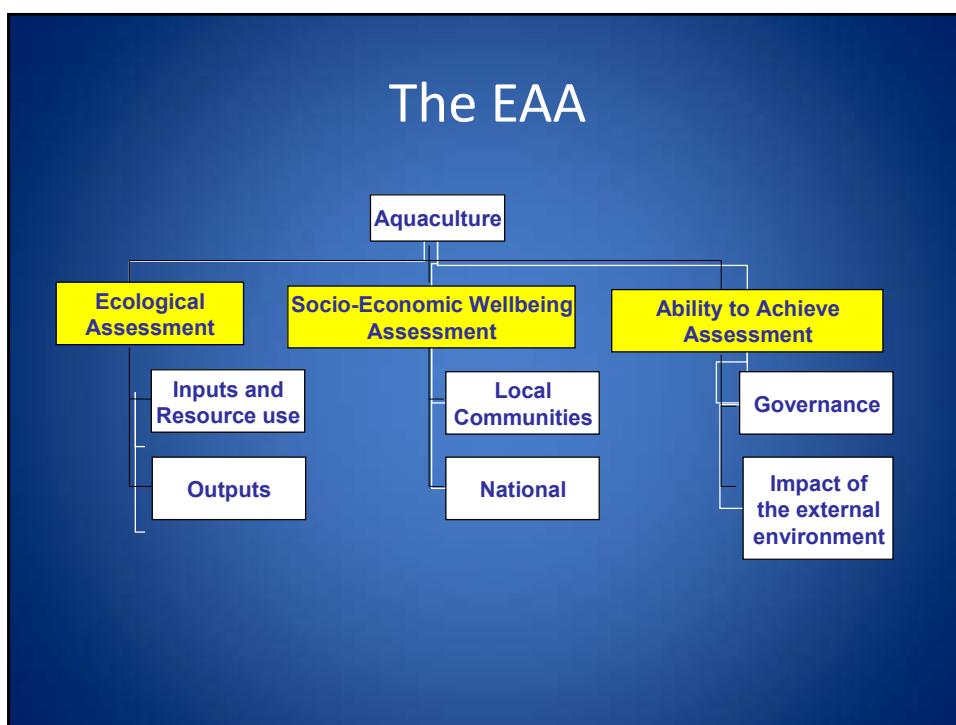
The global market-trade scale

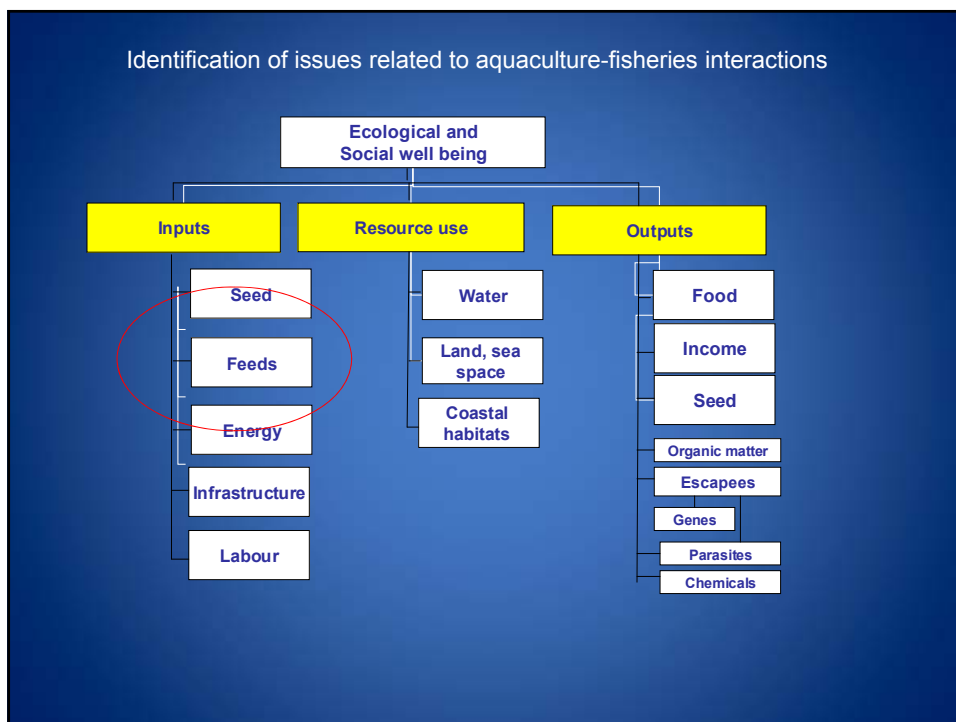
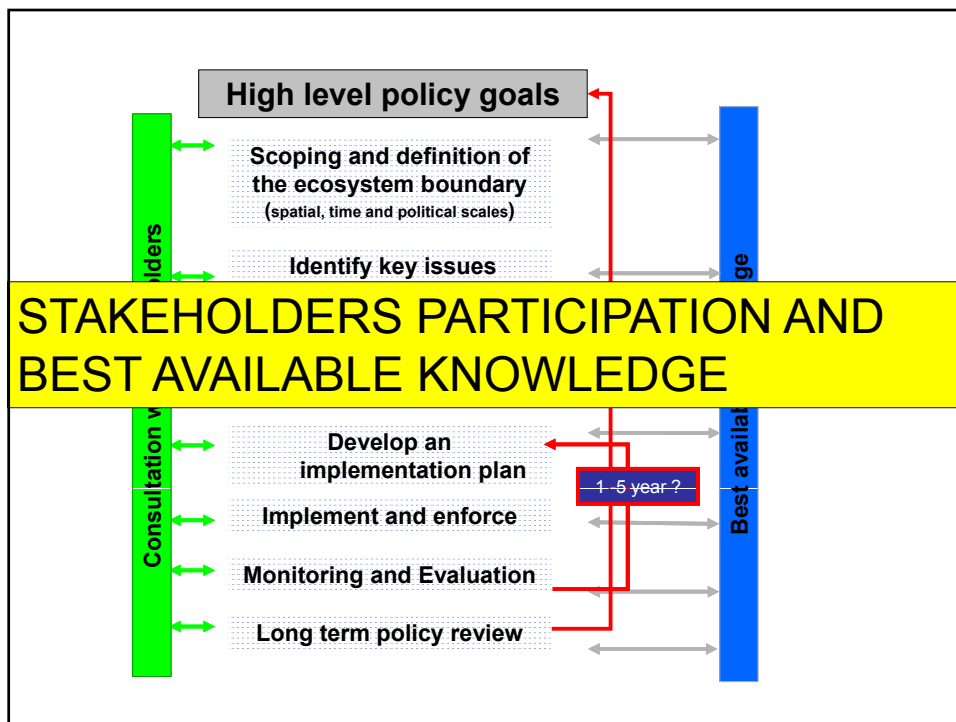


## Interrelationships between scales

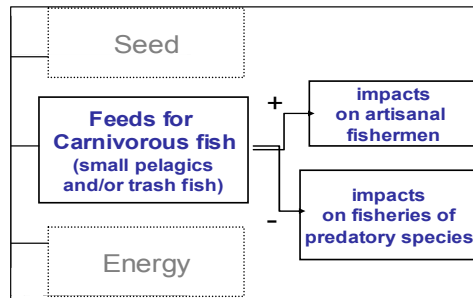


## The EAA



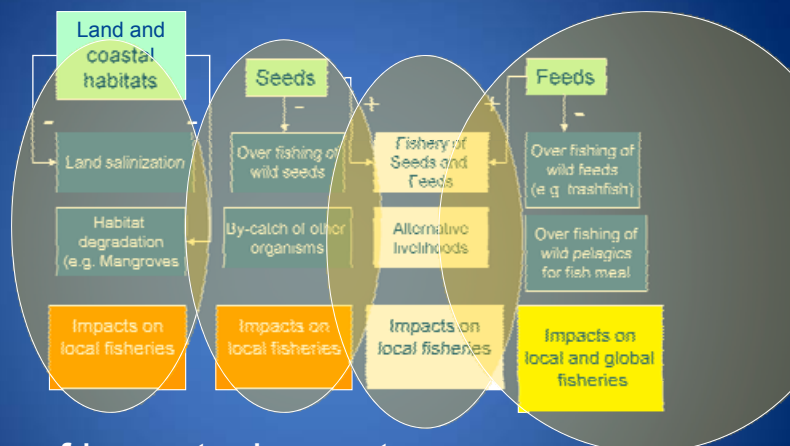


Impacts on fisheries means impacts on the resource and the associated socioeconomic system

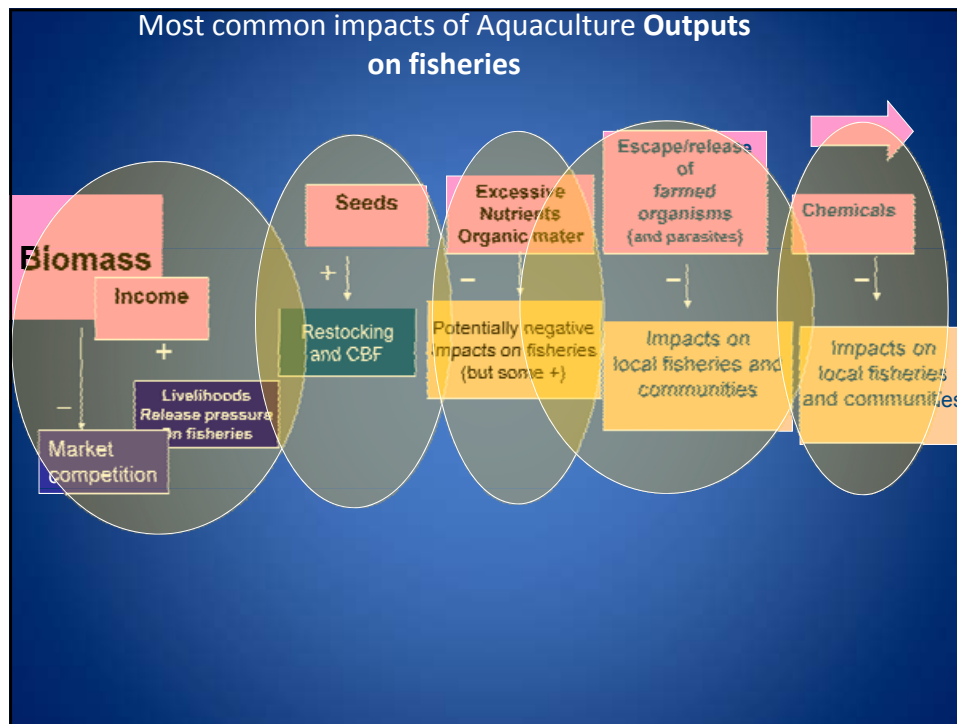


Is important to assess the risks both environmental and social

Most common impacts of aquaculture inputs and resource use on fisheries



Scales of impacts: in most cases at the watershed scale except for the use of fish meal/oil that takes place at a global scale



**Scales: there is a need to define the relevant management area/system for EAA taking care of fisheries issues**

- Aquaculture zone?
- Watershed and related marine water body (Ridge to reef)?
- Country??
- Transboundary issues in shared aquatic resource

## Overall Objectives

- To achieve net fish production at the lowest management scale and at larger scales as appropriate
- To achieve sustainable net fish production globally
- Enhance synergies, reduce conflicts

## Governance/institutional needs

- New institutions/management schemes and coordination to look at Fisheries and Aquaculture as **one fish** production system!!
- Greater efforts in F&A integrated research and knowledge building!!
- More efforts in knowledge dissemination and capacity building regarding A&F interactions

## Elements to consider in developing an EAA Implementation plan

- Must respond to operational objectives for the management area/system (addressing main F & A issues)
- Responding to overarching national policies (we must recognize regional and country differences)
  - Feed the poor? sustainably???
  - No food security issues; sustainability is a priority
  - We see large differences between North America/Europe and Asia
- Guided by the 3 EAA principles

## Some examples for potentially improved integration within an EAA/AAF

- Co-management of fisheries-aquaculture in
  - shrimp farming zones E.g. Gulf of Fonseca in Central America, Surabandans in India
  - Pangasinan area in the Philippines
  - Lake Volta in Africa (fish farming-fisheries)
- Zoning aquaculture areas with related MPA freeing areas for fishers
  - Mariculture parks in the Philippines

## Stock enhancement to mitigate nutrient overloading from aquaculture

- To reduce fish kills (cultured stocks in cages for example)
- To increasing the output from capture fisheries in the open waters and offer more food security and livelihoods
- To reduce eutrophication and nutrient levels in the water bodies, returning it to almost original ecological status.

