



What is required for responsible and productive aquaculture business?

Niels Svennevig
Vietnam



Regional seminar on aquaculture for Norwegian Embassies, Norad and fisheries advisers
Bangkok, January 16th 2013

Contents

- **Context and development perspective**
- **Practises - Risk management**
- **Role of GAP's and certification (short)**

Context and development perspective 1

- **Aquaculture has only been performed for a “few” generations, compared to agriculture**
- **Aquaculture is often considered a risky, unpredictable biological production due to lack of understanding or complying to “its” principles, compared to agriculture**
- **For aquaculture to be successful and sustainable (responsible and productive) there is a need to reduce the risk of losing the crop/income. This is in common for both the corporate investor and the poor subsistence farmer – as both of them count their money and the latter maybe even more**
- **However risk management has only been applied systematically when corporate large-volume farming was developed because of the large investments in equipment and especially in working capital**

Context and development perspective 2

- **The small-scale farming sector as known especially in SE Asia still needs to appreciate risk management as an approach, which could transform the sector into a more sustainable business, more resource efficient and more productive.**
- **What has been the impact to Asian aquaculture that risk management has not been developed and applied?**
 - **The most obvious development impact is that marine fish farming sector has not developed to the level of its potential – because it is considered too risky**

SE Asian farmed marine finfish volumes (FAO 2010)

- **Asia (from Pakistan to Japan):** **2.215.000 tons**
 - **China:** **811.000**
 - **Japan:** **321.000**
 - **ROK:** **80.000**

- **“Tropical Asia” :** **1.093.000 tons**
 - i.e. excl. China, ROK and Japan**
 - of which milkfish is at least 74%** **808.000**
 - but most is farmed in ponds or rivers!**

- **The use of the near shore areas of “Asia” for food production has by far not reached the level of its potential – this can easily appreciated when comparing with Norway, which produces more than 1 000 000 tons of fish/year from farming in the sea**

Farmed marine fish (tons) by country (FAO 2010)

Country	2009	2010
Indonesia	352.999	490.716
Philippines	349.305	351.217
Taiwan	73.831	78.239
Bangladesh	47.839	73.825
Malaysia	33.420	40.934
India	127.779	28.420
Thailand	17.851	16.270
Viet Nam	6.000	7.100
Singapore	1.939	2.764
China, Hong Kong SAR	2.105	2.323
Cambodia	340	420
Myanmar	105	225
Brunei Darussalam	65	132
Sri Lanka	9	12
Total	1.013.588	1.092.598

Business structures in marine fish farming

■ Small-scale approach

- **Traditional/easy to copy; small investment; family based; very segmented business structure**
- **Target is the domestic and regional, high-value, live fish market segment. Larger productions achieved by ‘duplication’ rather than ‘efficiency of scale’**
- **Production increase constrained by lack of protected sites; diseases/environmental impact; small live fish market volume; difficulty to manage by authorities**

■ Large-volume approach

- **Modern/emerging; investment intensive; corporate based; vertically integrated business structure from ‘egg to shelve’**
- **Target fresh/frozen white fish market segment (regional and Global) through large productions of medium-value fish by ‘efficiency of scale’**



Small-scale farming

Volume by duplication

Image © 2011 DigitalGlobe
© 2011 Mapabc.com

© 2010 Google



Large-volume farming

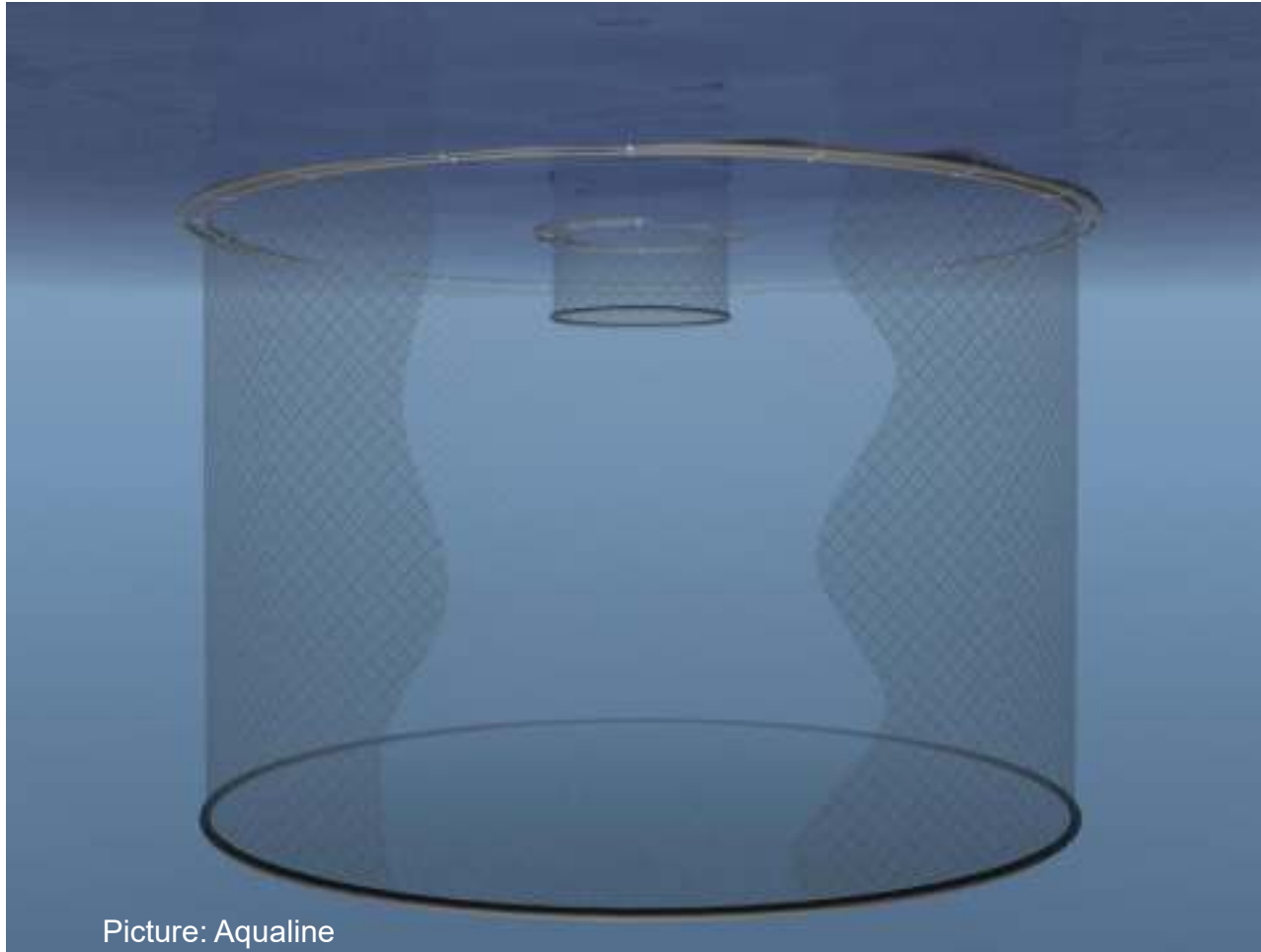


Sarangani Bay, Philippines



Marine Farms Vietnam

The 'extreme' development trend in cage size in salmon farming



Picture: Aqualine

Volume increased 100 times compared to pioneer days in Norway:

40m circumference cage with 4 m deep net = 550 m³

157m circumference cage with 30 m deep net = 60 000 m³

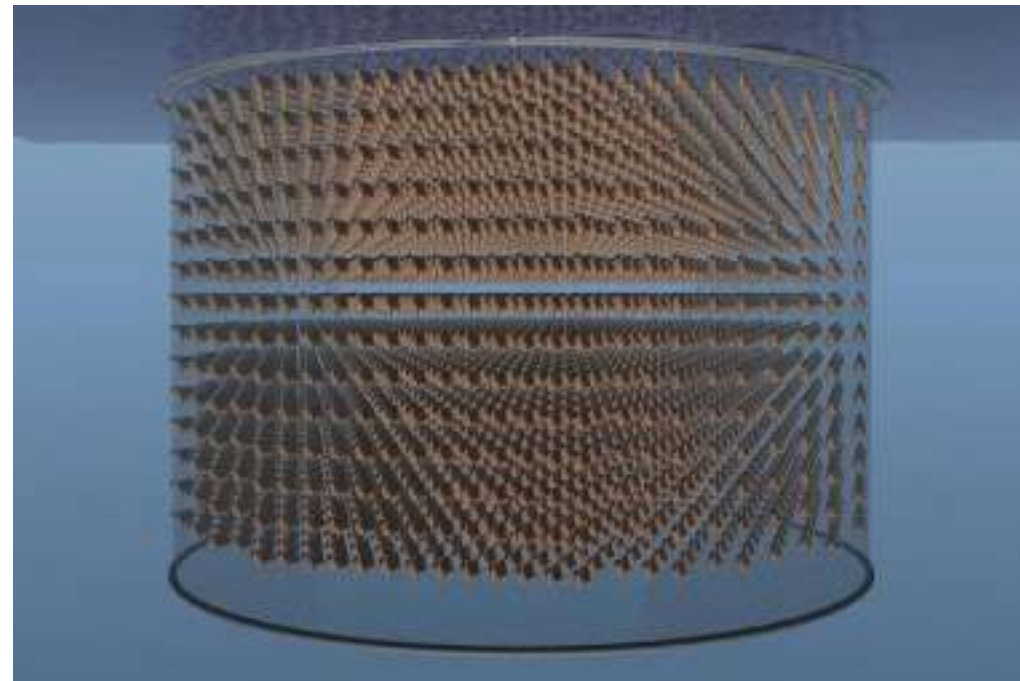
**If maximum biomass is 16kg fish/m³
ONE large cage would hold 1 000 tons of fish
(in SE Asia still only 100m circumference and 100 tons)**

1 000 tons of fish biomass in one cage



If turning this fish biomass into 'cow units' of 500 kg/cow:

It equals taking care of 2 000 cows; but the challenge is in addition to the large number that you cannot see them!



That's why!!! it takes a skilled 'shepherd' plus 'something more' to tend one cage

Large-volume farming - large financial risk

Large investments in equipment and working capital

- **1 000 tons of salmon = 3 mill.USD in production costs**



Risk management therefore has become a key focus:

- **Through vertically integrated setup; having control from own hatchery to direct sales to distributors**
- **Through planning, appropriate hardware and skilled operational management and workers, biosecurity etc.**

Elements of risk management in practise

- Localities/site selection: Wave/current analyses etc.
- Infrastructure /equipment: Mooring design/dimensioning; proven cage structures; nets; predator nets; feeders; work boats etc.
- Bio-security: Traceable, disease-screened, vaccinated fingerlings; pellet feed; low stocking density; clean nets; environmental impact monitoring; blood water and mort removal; separated generations; fallowing etc.
- Staff: Trained, skilled and educated; production planning – feeding management

- Insurance: If available



- Government: Regulations in place and enforced!; Institutional support

Localities/Site selection: Wave and current

Significant wave height

A $H_s < 0.5\text{m}$

B $0.5\text{m} < H_s < 1.0\text{m}$

C $1.0\text{m} < H_s < 3.0\text{m}$

D $H_s > 3.0\text{m}$

i.e. the average height of the tallest
33% of the waves.

Current velocity

a $u < 0.25\text{m/s}$

b $0.25\text{m/s} < u < 0.5\text{m/s}$

c $0.5\text{m/s} < u < 1.0\text{m/s}$

d $u > 1.0\text{m/s}$

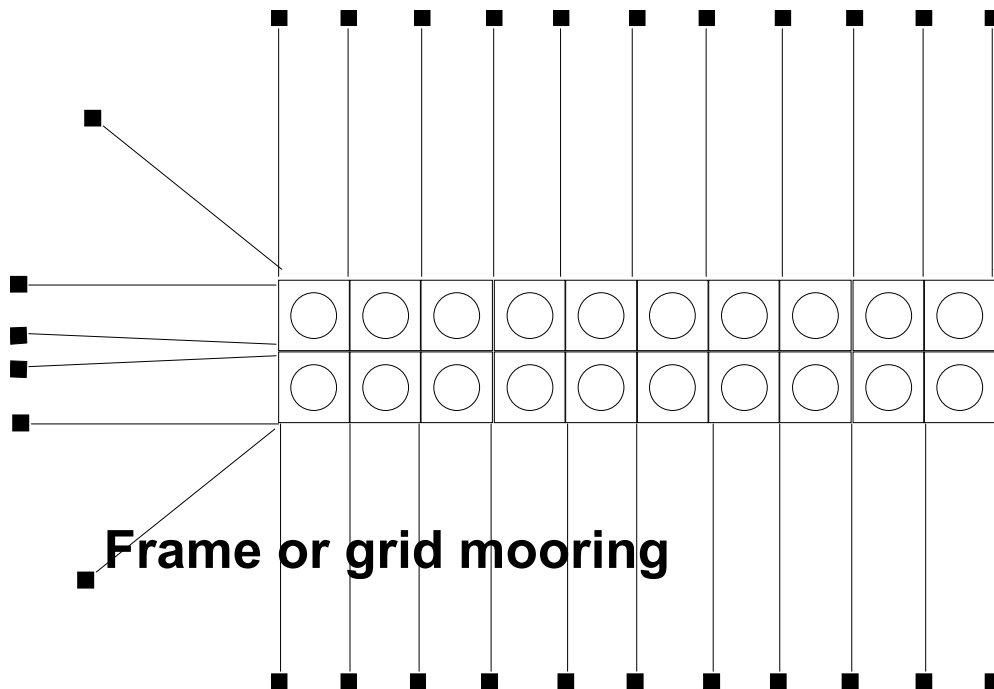
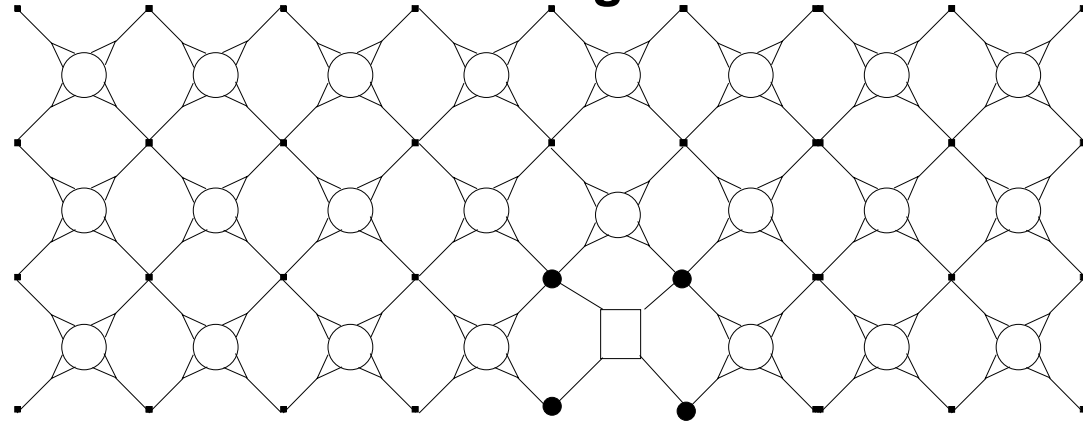
- Optimal current conditions crucial for oxygen supply and good biological performance at the farm
- Site selection includes many other factors

Equipment: Mooring designs and anchors

Often the only available 'insurance'



'Individual' mooring



Picture Aqualine

Equipment: Example of failed mooring

After typhoon

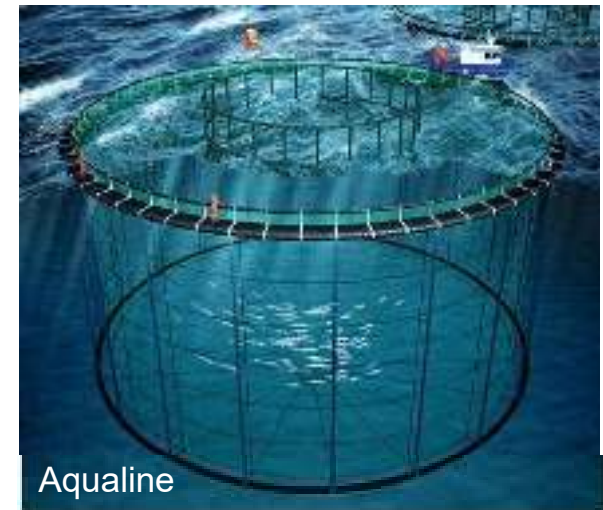


Fishing boat anchors

Equipment: Proven cage design

Some 'rules of thumb' for a (first time) investor:

- Only choose sites which can be operated by proven cage designs.
- The circle cage was launched commercially in 1974. At least 70 000 units installed
- Let 'scientific/pilot test farms' or 'veterans' be pioneers in using new cage designs
- Appreciate that depreciation (equipment) only contributes 3-5% of production costs. Get things right from the start. Remember also to spend time on important budget lines.
- Simplicity: Few but correct dimensioned components are easier to inspect



Biosecurity: Small-scale feeding approach



Fujian, China and Langkawi, Malaysia

Biosecurity: Large-volume feeding approach

- Feed blower, up to 10-14 tons pellets/day (15-25.000USD)



Marine Farms Vietnam

Biosecurity: Failed large-volume feeding



Nghe an, Vietnam and Qingdao and Fujian, China

Biosecurity: Trial-vaccination of cobia



Biosecurity: Parasite check of pompano; corralling fish for freshwater bath



Processing/Quality/Market access

- Increasing Global demand for fish, which capture fisheries cannot supply.
- Food security. Demand for medium to low-valued fish, which can enter the fresh/chilled/frozen and value added market segments. For regional or WW distribution
- Through “efficiency of scale” large-volume farming can supply:
 - Traceable and consistent large volumes; utilising more exposed sites with good water quality
 - Resulting in production costs low enough to farm species, which can enter processing

Species selection: Properties of marine fish suitable for food security production?

- Large volume market
 - Not damaged if supplied 50 tons
 - White fish, especially regional market
 - If can enter the sashimi segment, chances are good in the Global market
- Suitable for fresh/frozen/processing
 - Medium-value fish
- Suitable biology i.e. growth and schooling behaviour
- Availability of juveniles
 - In large, consistent numbers
- Which species in Asia?
 - Pompano, snappers, sea bass, breams, croakers, cobia, yellowtails (and tuna)
 - Not silver pomfret and groupers



Species selection: Some candidates



How can Norway contribute to increased aquaculture production in Asia?

- Assist in technology transfer of approach from large-volume farming – through private sector or capacity building of institutions for the benefit of food security and job creation
- Small-scale farming, which has an important social dimension in Asia, could be assisted to become a better sustainable business, more resource efficient and more productive if organised in clusters, achieving large-volume benefits such as efficiency of scale
- Challenges in implementing risk management?
 - To a multispecies environment
 - To an insufficient regulated farming environment

Are GAP's and certifications conducive for developing responsible and productive aquaculture business??

- **Guaranteed Asset Protection (GAP) in its Asian format is a method to introduce risk management to the small-scale farmers**
- **But confusing certificate/consumer labels have emerged**
 - **Scope unclear, inconsistent criteria between species, unscientific methodology -escapees when no genetic selection issue, nothing re. carbon footprint, animal welfare**
 - **Strong commercial interest by the NGO's themselves – a 'consultant' driven development; targeting producers and retailers for financing and not caring about the consumers they claim to represent.**
 - **COOP – largest supermarket chain in Scandinavia - found that consumers cared most about food safety and price and only 2% knew the MSC (Marine Stewardship Council) brand.**
- **Labels can be used in market distortion against Asia!**

Market distortion against Asia

Monterey Bay Aquarium's Seafood WATCH: Table of sustainability ranks for cobia

Sustainability Criteria	Conservation concern			
	Low	Moderate	High	Critical
Use of marine resources		Recirculation (USA)	Ocean cages (Belize, Asia)	
Risk of escaped fish to wild stocks	Recirculation (USA) Ocean cages (Belize)	Ocean cages (Asia)		
Risk of disease and parasite transfer to wild stock	Recirculation (USA)		Ocean cages (Belize, Asia)	
Risk of pollution and habitat effects	Recirculation (USA)	Ocean cages (Belize)	Ocean cages (Asia)	
Management effectiveness	Recirculation (USA)	Ocean cages (Belize)	Ocean cages (Asia)	

Market distortion against Asia

Recommendation for Cobia sourcing by Seafood WATCH

Overall seafood recommendation			
Closed recirculation (USA):	Best Choice	Good Alternative	Avoid
Ocean cages (Belize):	Best Choice	Good Alternative	Avoid
Ocean cages (Asia):	Best Choice	Good Alternative	Avoid

The ONE promoted USA company produced 10 tons cobia in 2009 – i.e. 0.03% of the Global production

Will this attitude contribute to world's food security??

The most farmed marine fish Milkfish >800 000 tons/year
One of the few farmed, omnivore marine fish, Indonesia, Philippines and Taiwan
Mainly regional/domestic and ethnic-expat markets

THANK YOU

