JIFSAN Good Aquacultural Practices Program

Trade and Aquaculture Products

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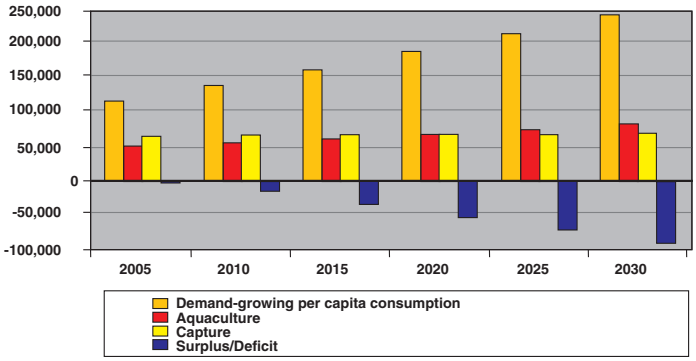
Consumers worldwide have created a market for aquacultured products. When food safety problems arise, trade is affected negatively in this market. Profits are negatively impacted through lost product, fines, delays, and negative publicity. To avoid these losses, aquaculture producers should establish critical limits in their production process and use GaqPs.

The Aquaculture Market

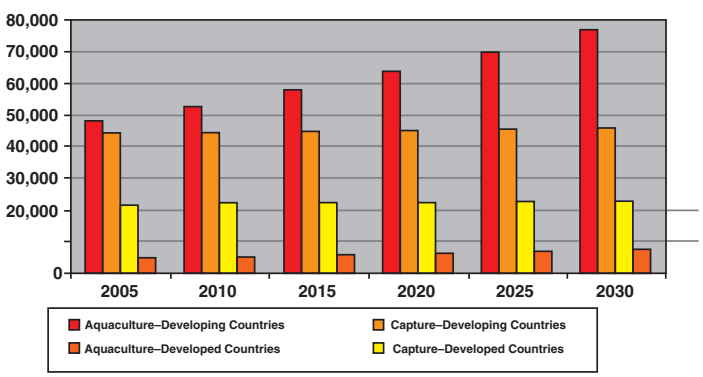
Worldwide demand for aquaculture products is increasing, while consumers are demanding aquaculture products to be safe and wholesome. Current production will not be able to satisfy demand, and the deficit in 2030 will be almost 92 million tons. This forecast deficit will have a major impact on trade, as less product will be available for trade to developed countries, and South-South trade should expand. Prices are expected to go up, which in turn will hamper demand.

OUTLOOK:TRADE



The entire food fish production (e.g., excluding fishmeal/fish oil) is forecast to reach about 150 million tons by 2030. If the current trend is going to be confirmed, aquaculture will overtake capture production in the year 2020.

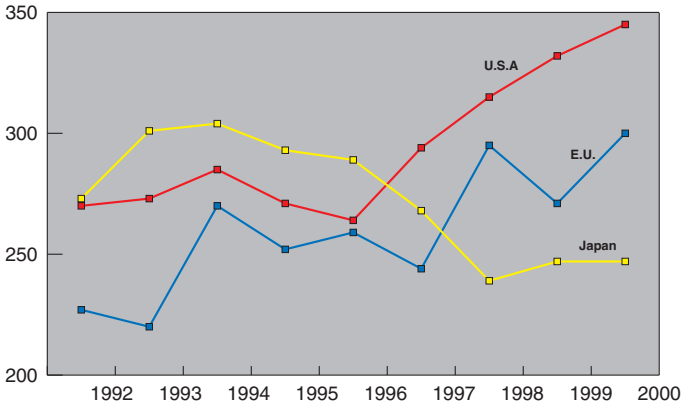
The following graph summarizes the trends in fish production.



Several points are evident from this graph:

- Developing countries will extend their share in total production (2030: about 80% of worldwide production)
- Capture production keeps basically stable in both developed and developing countries
- Aquaculture in developing countries has the biggest growth potential for future fish production. In those countries, aquaculture could increase up to 76 million tons by 2030. Production in developed countries will also grow, but will be responsible for less than 10% of the total aquaculture production. (2030: 7 million tons).

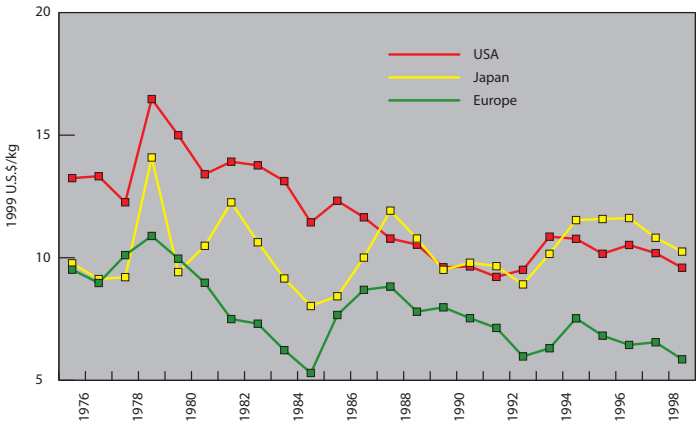
Shrimp Imports by U.S.A., Europe and Japan
Volume in Estimated Round Weight



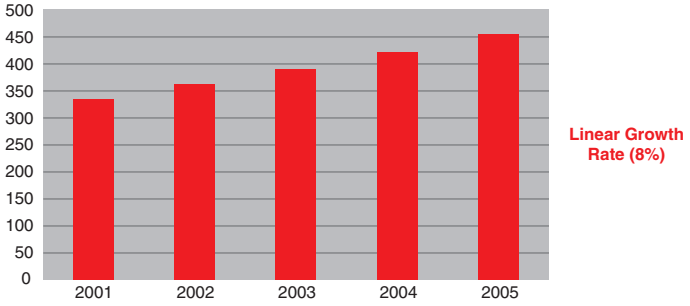
Shrimp imports to the U.S. and E.U. continue to grow.

The importation of shrimp into the U.S. as well as into the E.U. continues to increase. The reason for this is because aquaculture has allowed shrimp to become available year round, in a variety of uniform sizes, with consistent quality. And most importantly, aquaculture has allowed the price of shrimp to fall at the retail level. This has caused an increase in consumption and thus the need for more and more imports.

Real Price (U.S.$) Trend in U.S., Europe and Japan.



Forecasted U.S. Shrimp Consumption



Shrimp prices continue declining while U.S. shrimp consumption continues to grow.

Food Safety Challenges

Around the world, inspectors and consumers have found pathogens and unapproved aquaculture drugs in aquaculture products. This results in:

- Rejected product,
- Enforcement actions against industry, country, importers, etc. ,
- Potential for bad media attention, and
- Delays in getting product to market.

Over the last ten years about 10% of all shrimp samples have tested positive for salmonella. In other seafoods, the incidence of salmonella is roughly 7% for aquacultured products, but less than 1% for captured product.

In August 2001, Seafood.com, reported that chloramphenicol was found in farmed shrimp from China. Un-approved drug residues have been detected from many countries and products. Legal action has been taken against some of the producers. Many microbiological and medical groups have expressed concerns about anti-microbial resistance.

Several countries cannot ship into the U.S. for *salmonella* in various aquaculture products. At any given time hundreds of firms cannot ship to the U.S. due to *salmonella* and drugs in various aquaculture products.

GaqPs in Aquaculture Production

The aquaculture industry can promote a wholesome, safe, and healthy product through Good Aquaculture Practices—GaqPs.

What are GAqPs?

Good aquacultural practices require that the facility and input to the facility be controlled and monitored for possible contaminants and for avoidance of conditions that will favor pathogen growth. Below are some examples of poor aquacultural practices, conditions that should be avoided.

Table 1—Summary of completed testing of seafood samples for aquaculture drugs in FY 2005.

Species–Aquaculture	Drug	Samples	Countries–# Positives/Country
Catfish/Basa			
Fluoroquinolones	98	2	9/Vietnam (9)
Malachite green	6	1	3/Vietnam (3)
Quinolones	6	1	0
Crayfish			
Chloramphenicol	1	1	0
Salmon			
Ivermectin	46	4	0
Quinolones	54	3	0
Malachite green	10	2	0
Shrimp			
Chloramphenicol	219	12	5/Vietnam (3), Malaysia (1), Thailand (1), China (1), Indonesia (2)
Nitrofurans	50	7	3
Fluoroquinolones	28	5	0
Quinolones	10		
Oxytetracycline	11		
Tilapia			
Quinolones	1		
Crab			
Chloramphenicol	111	12	11/Vietnam (7), Indonesia (3), UK (1)
Sole			
Malachite green	3	1	0
Grouper			
Fluoroquinolones	1	1	1/Vietnam
Malachite green	1	1	1/Vietnam
Eel			
Malachite green	1	1	1/China

Species-Aquaculture	Drug	Samples	Countries-# Positives/Country
Shrimp			
Chloramphenicol	410	16	6/VN (2), India (2), Venezuela (1), Peru (1)
Crab			
Chloramphenicol	114	11	22/VN (9), China (6), Indonesia (5), India (1), Thailand
Crayfish			
Chloramphenicol	29	2	0
Salmon			
Oxolinic acid	5	2	0
Catfish			
Malachite green	58	1	0
Quinolones, incuding Oxolinic Acid and Flumequine	58	1	0

Sources of Contamination

Site Selection

Improper site—Houses with no plumbing, animals, human activity, etc.

Improper site—animal waste running into pond.

Source and Pond Water Protection

Pond protection—possible PCB contamination during runoff.

Source and pond water not protected from water fowl contamination.

Pond water not protected from animal waste runoff.

Human sewage going onto ground around pond.

Human waste draining onto ground around pond.

Ice and Equipment Control

Shrimp being contaminated via dirty ice, dirty water, and ice made from non-potable water.

Site Control

Example of poor site control—animals and children in pond.

Feed Control

An example of improperly stored feed. The black pellets are rodent waste.